

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

771 Closure Project Decommissioning Operations Plan Modification 3 and Proposed Action Memorandum for Under Building Contamination Remediation

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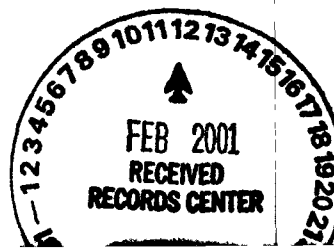
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RECORD OF MODIFICATIONS

1	6/7/00	Field modification to clarify the endstate
2	6/14/00	Field modification to separate Set 38 into four separate sets
3	pending	Major modification incorporating under building contamination remediation and demolition activities

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ACRONYMS AND ABBREVIATIONS

AHA	activity hazard analyses
AR	Administrative Record (File)
ARARs	applicable or relevant and appropriate requirements
AST	aboveground storage tank
BIO	Basis for Interim Operation
CCR	Code of Colorado Regulations
CDD	Closure Description Document
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHWA	Colorado Hazardous Waste Act
CHWR	Colorado Hazardous Waste Regulations
CPB	Closure Project Baseline
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U S Department of Energy, Rocky Flats Field Office
DOP	Decommissioning Operations Plan
DOT	U S Department of Transportation
dpm	disintegrations per minute
DPP	Decommissioning Program Plan
EPA	U S Environmental Protection Agency
ER	environmental restoration
ES&H	environmental safety and health
FDPM	Facility Disposition Program Manual
HASP	Health and Safety Plan
HEPA	high efficiency particulate air
HVAC	heating, ventilation and air conditioning
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IDEC	indirect/direct evaporative cooling
IDC	Item Description Code
IGD	RFCA Implementation Guidance Document
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/Interim Remedial Action

ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
IV	independent verification
IVC	Independent Verification Contractor
IWCP	Integrated Work Control Program
JHA	job hazards analysis
LLW	low-level waste
LLMW	low-level mixed waste
LRA	lead regulatory agency
MOU	Memorandum of Understanding
N/A	not applicable
nCi	nanocurie
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NTS	Nevada Test Site
OSHA	Occupational Safety and Health Administration
PA	Protected Area
PAC	potential area of concern
PAM	Proposed Action Memorandum
PCBs	polychlorinated biphenyls
PCOC	potential contaminant of concern
PDS	pre-demolition survey
PDSP	Pre-Demolition Survey Plan
PEB	pre-evolution briefing
PMP	Project Management Plan
POD	Plan of the Day
POW	Plan of the Week
PPE	personal protective equipment
psi	pounds per square inch
RACT	reasonably available control technologies
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFCAB	Rocky Flats Citizens Advisory Board
RFCLOG	Rocky Flats Coalition of Local Governments

RFETS	Rocky Flats Environmental Technology Site
RISS	Remediation, Industrial Decommissioning, and Site Services
RLC	reconnaissance level characterization
RLCR	Reconnaissance Level Characterization Report
RSOP	RFCA Standard Operating Protocol
RTR	real-time radiography
SCO	surface-contaminated object
Site	Rocky Flats Environmental Technology Site
SNM	special nuclear material
STP	Site Treatment Plan
TP	termination point
TRM	transuranic mixed waste
TRU	transuranic waste
TSD	treatment, storage, disposal (facility)
TU	temporary unit
UBC	under-building contamination
UCNI	Uncontrolled Classified Nuclear Information
UST	underground storage tank
VOC	volatile organic compound
WAC	waste acceptance criteria
WGI	waste generation instruction
WIPP	Waste Isolation Pilot Plant

EXECUTIVE SUMMARY

This Decommissioning Operations Plan (DOP) modification for the 771 Closure Project applies to buildings with significant contamination or hazards (Type 3 facilities) and buildings without significant contamination or hazards, but in need of decontamination (Type 2 buildings). This DOP modification is also the Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) decision document for the under building contamination remediation. The identification of Type 1 facilities and their disposition path are included for information only. This document is a major modification of the DOP for the 771 Closure Project approved January 1999. The modification is a complete re-write due to the scope of the changes. This modification follows the format of the other DOPs and contains additional detail on work activities. This additional detail reflects the advanced state of the 771 Closure Project decommissioning activities and planning. This modification includes the following additional information and changes:

- Additional physical and historical information about Building 771 (see Section 3.1)
- The Type 2 facilities (throughout the document, but particularly in Sections 3.1, 4.3, 4.4, and 4.7)
- Reference to the RFCA Standard Operating Protocols (RSOPs). This modification satisfies the notification requirements of the RSOPs (throughout the document, but particularly in Sections 4.4 and 4.7)
- Demolition activities (see Section 4.7)
- Under-building contamination remediation activities (see Sections 4.5, 5.1, 7.0, and 8.0)
- A streamlined Resource Conservation and Recovery Act (RCRA) closure process, which reduces paperwork (see Section 6.0)
- An exception to the *RSOP for Recycling Concrete*, which will eliminate the need to stockpile and size reduce the concrete while still meeting the lifetime subsidence requirement in the RSOP (see Section 5.5)

In general, the 771 Closure Project dispositioning will be conducted in the following sequence: deactivation activities will be completed, component removal, size reduction, and decontamination will be conducted, the under building contamination will be remediated, as necessary, the pre-demolition survey will be conducted, and the building will be demolished. The outbuildings surrounding Buildings 771 and 774 will be conducted in the same manner.

Three alternatives were considered for the near-term management of the 771 Closure Project decommissioning, no action with safe shutdown maintenance, and facility reuse. The alternatives included the evaluation of potential impacts on the human environment. Alternative 1 is selected because decommissioning and the associated hazard reduction support the Rocky Flats Vision of safe, accelerated, cost-effective closure. This alternative also ensures long-term protection of public health and the environment. Short-term impacts on the environment (i.e., impacts occurring during the interval of the action) will be controlled physically and administratively. Currently, the facilities within the 771 Closure Project are scheduled to be deactivated and decommissioned, and the under-building contamination remediated by August 2004. Environmental impacts resulting from the 771 Closure Project will contribute incrementally to potential Site-wide cumulative impacts associated with the Rocky Flat Environmental Technology Site (RFETS or Site) Closure Project. Given the existing industrial setting of the 771 Closure Project, environmental impact issues associated with the project are relatively limited.

For planning purposes, the 771 Closure Project was divided into small manageable groupings of similar equipment and rooms. Thirty-three Dismantlement Sets and 13 Decommissioning Areas were defined for decommissioning activities for the 771 Closure Project.

Consistent with the objectives of RFCA, the 771 Closure Project team will select decommissioning techniques based on a variety of factors, including potential environmental, safety and health (ES&H) hazards, secondary waste generation, and cost-effectiveness. Performance specifications for the

techniques will include meeting the applicable release criteria, minimizing the generation of hazardous, radioactive and secondary wastes, minimizing ES&H impacts, and complying with the applicable or relevant and appropriate requirements (ARARs), and waste acceptance criteria for treatment, storage and disposal facilities

The 771 Closure Project team will perform decommissioning activities upon completion of appropriate reviews in compliance with Site programs and procedures, including the Site Integrated Work Control Program (IWCP), which incorporates the RFETS Integrated Safety Management System (ISMS), Readiness Determination Program, Integrated Environmental Management Program, and Quality Assurance Program. Site requirements will be applied based on a graded approach (i.e., more rigorous requirements will be applied to facilities with greater hazards). In addition, personnel and environmental monitoring systems will be used, including Site-wide and project-specific air, surface water, and groundwater monitoring systems as described in the RFETS Integrated Environmental Management Program Manual and Site Integrated Monitoring Plan.

Throughout the course of the 771 Closure Project, personnel of the U.S. Department of Energy, Rocky Flats Field Office (DOE), the contractor and subcontractors, and the regulatory agencies will use the RFCA consultative process to establish and maintain effective working relationships with each other and with the general public. Decommissioning activities will be documented in the 771 Closure Project Files, RCRA Operating Record, where appropriate, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR). Upon completion of decommissioning activities and final characterization, DOE will prepare and submit to the Lead Regulatory Agency (LRA) for approval a Decommissioning Closeout Report.

1 INTRODUCTION

In 1996, the DOE, the Environmental Protection Agency (EPA), and the CDPHE executed the RFCA¹ RFCA is the Federal Facility Compliance Agreement and Consent Order negotiated pursuant to the CERCLA² and Colorado Hazardous Waste Act (CHWA)³ RFCA provides the regulatory framework for achieving the goals expressed in the Rocky Flats Vision⁴

The overriding vision for RFETS is to achieve accelerated cleanup and Site closure in a manner that is safe to workers and the public, and protective of the environment DOE intends to disposition all special nuclear material (SNM) and wastes, demolish facilities, and remediate contaminated areas to the extent that future land uses are enabled and downstream water supplies are protected

The 771 Closure Project is comprised of Buildings 771, 774, 714, 714A, 715, 716, 717, 770, 771B, 771C, 771-DT, and a number of outside storage tanks, storage areas, and trailers, all of which are located within the Protected Area (PA) of the Site Completing the 771 Closure Project is necessary to meet the goals of the RFCA and the Rocky Flats Closure Project Baseline (CPB)

In general, the 771 Closure Project dispositioning will be conducted in the following sequence deactivation activities will be completed, component removal, size reduction, and decontamination will be conducted, the under building contamination will be remediated, the pre-demolition survey will be conducted, and the building will be demolished The outbuildings surrounding Buildings 771 and 774 will be conducted in the same manner

The decommissioning scope in this DOP applies to buildings with significant contamination or hazards (i.e., Type 3 buildings) and buildings without significant contamination or hazards, but in need of decontamination (i.e., Type 2 buildings) Buildings within the Cluster that are free of contamination (i.e., Type 1 buildings) will be decommissioned using Site procedures upon notification to the LRA (CDPHE) Building 771 is a Type 3 facility, Buildings 714, 728, 770, 774, and 771C are Type 2 facilities, and the remaining buildings/trailers located within the 771 Closure Project are classified as Type 1 buildings Eleven tanks have been classified as Type 2 facilities, these tanks are 176, 182, 183, 184, 185, 194, 195, 292, 293, 774A and 774B Therefore, the scope of this DOP is limited to Buildings 771, 714, 728, 770, 774, 771C and the eleven Type 2 tanks Table 1 details all of the facilities associated with the 771 Closure Project, the typing, and if the facility disposition decision is addressed by this DOP modification

Table 1. 771 Closure Project Facilities

Facility	Type	DOP modification scope
771, plutonium recovery facility, includes 771A, 771 stack, 771/776 tunnel, and 771/774 tunnel	3	Within the scope of the DOP
774, liquid treatment plant	2	Within the scope of the DOP
714, hydrofluoric storage	2	Within the scope of the DOP
714A, hydrofluoric storage	1	Included in the DOP for information purposes

¹ Final Rocky Flats Cleanup Agreement (RFCA), Federal Facility Agreement and Consent Order (CERCLA VIII-96-21, RCRA 3008[h] VIII-96-01, State of Colorado Docket 96-07-19-01), July 19, 1996

² Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9620 *et seq*

³ Colorado Hazardous Waste Act (CHWA), CRS 25-15-101 *et seq*

⁴ The Rocky Flats Vision is contained in Appendix 9 of RFCA

Table 1. 771 Closure Project Facilities

Facility	Type	DOP modification scope
715, emergency generator #1	1	Included in the DOP for information purposes
716, emergency generator #2	1	Included in the DOP for information purposes
717, magnehelic gauge building/sampling shed	1	Included in the DOP for information purposes
728, process waste pit	2	Within the scope of the DOP
770, 774 maintenance/771 war room	2	Within the scope of the DOP
S770, storage facility	1	Included in the DOP for information purposes
T771A, office trailer	1	Included in the DOP for information purposes
T771B, office trailer	1	Included in the DOP for information purposes
T771C, showers/locker trailer	1	Included in the DOP for information purposes
T771E, office trailer	1	Included in the DOP for information purposes
T771F, office trailer	1	Included in the DOP for information purposes
T771G, showers/locker trailer	1	Included in the DOP for information purposes
T771H, office trailer	1	Included in the DOP for information purposes
T771J, office trailer	1	Included in the DOP for information purposes
T771K, office trailer	1	Included in the DOP for information purposes
T771L, restroom trailer	1	Included in the DOP for information purposes
T771Q, office trailer	1	Included in the DOP for information purposes
T771R, office trailer	1	Included in the DOP for information purposes
T771T, office trailer	1	Included in the DOP for information purposes
T771MB, mobile breakroom trailer	1	Included in the DOP for information purposes
771B, carpenter shop	1	Included in the DOP for information purposes
771C, nuclear waste packaging and drum counting, includes tanks 309E and 309W	2	Within the scope of the DOP
771-DT, decontamination trailer	1	Included in the DOP for information purposes
772, HF acid storage	1	Included in the DOP for information purposes
772A, acid storage	1	Included in the DOP for information purposes
773, incident command center	1	Included in the DOP for information purposes
774A, steam condensate holding tank	2	Within the scope of the DOP
774B, steam condensate holding tank	2	Within the scope of the DOP
775, sewage lift station	1	Included in the DOP for information purposes
T21A, aboveground storage tank	1	Included in the DOP for information purposes
Tank 173, propane storage tank	1	Included in the DOP for information purposes
Tank 174, liquid argon tank	1	Included in the DOP for information purposes
Tank 176, sodium hydroxide tank	2	Within the scope of the DOP
Tank 179, propane storage tank	1	Included in the DOP for information purposes
Tank 180, cooling water storage tank	1	Included in the DOP for information purposes

Table 1. 771 Closure Project Facilities

Facility	Type	DOP modification scope
Tank 182, neutralized waste second staging holding tank #66	2	Within the scope of the DOP
Tank 183, neutralized waste second staging holding tank #67	2	Within the scope of the DOP
Tank 184, neutralized waste second staging holding tank #68	2	Within the scope of the DOP
Tank 185, potassium hydroxide holding tank	2	Within the scope of the DOP
Tank 192, diesel storage tank	1	Included in the DOP for information purposes
Tank 193, diesel storage tank	1	Included in the DOP for information purposes
Tank 194, hydrofluoric acid storage tank D-44	2	Within the scope of the DOP
Tank 195, hydrofluoric acid storage tank D-45	2	Within the scope of the DOP
Tank 197, LP gas storage tank 450-781	1	Included in the DOP for information purposes
Tank 292, firewater collection tank	2	Within the scope of the DOP
Tank 293, firewater collection tank	2	Within the scope of the DOP

This document is a major modification of the DOP for the 771 Closure Project approved January 1999. The modification is a complete re-write due to the scope of the changes. This modification follows the format of the other DOPs and contains additional detail on work activities. This additional detail reflects the advanced state of the 771 Closure Project decommissioning activities and planning. This modification includes the following additional information and changes:

- Additional physical and historical information about Building 771 (see Section 3.1)
- The Type 2 facilities (throughout the document, but particularly in Sections 3.1, 4.3, 4.4, and 4.7)
- Reference to the RSOPs. This modification satisfies the notification requirements of the RSOPs (throughout the document, but particularly in Sections 4.4 and 4.7)
- Demolition activities (see Section 4.7)
- Under-building contamination remediation activities (see Sections 4.5, 5.1, 7.0, and 8.0)
- A streamlined RCRA closure process, which reduces paperwork (see Section 6.0)
- An exception to the *RSOP for Recycling Concrete*, which will eliminate the need to stockpile and size reduce the concrete while still meeting the lifetime subsidence requirement of the RSOP (see Section 5.5)

1.1 Alternatives Analysis and Selection

To determine the most efficient path to accelerated cleanup and Site closure, the RFETS Facilities Use Committee evaluated three alternatives for the near- and long-term management of RFETS facilities:

- Alternative 1 - Decommissioning (i.e., component removal, size reduction, decontamination, and demolition),
- Alternative 2 - No action with safe shutdown maintenance (i.e., mothballing), and
- Alternative 3 - Facility reuse

Table 2 summarizes the results of this analysis. As discussed in the Facility Assessment for the Industrial Area (IA) Reuse Study, Alternative 3 is not beneficial, because Site cleanup and closure would be deferred but not eliminated. Similarly, Alternative 2 fails to accomplish the Rocky Flats Vision, resulting in an increase in the life-cycle costs associated with Site cleanup and closure.

The alternatives were evaluated for potential impacts on the human environment. Alternative 1 is the selected alternative because decommissioning supports the Rocky Flats Vision of safe, accelerated, cost-effective closure. This alternative also maintains long-term protection of public health and the environment. By removing RFETS facilities and associated contamination, risks currently posed by the 771 Closure Project will be reduced and/or eliminated.

1.2 Decommissioning Under the Rocky Flats Cleanup Agreement

The RFETS Decommissioning Program Plan (DPP)⁵ presents the regulatory approach to decommissioning and compliance with RFCA. The Facility Disposition Program Manual (FDPM)⁶ establishes the RFETS internal requirements for planning and executing decommissioning activities, including preparation of a Project Management Plan (PMP).⁷ The PMP documents planning activities for each project.

As described in the DPP, buildings are typed based on levels of contamination. Buildings classified as Type 1 are free of contamination, Type 2 buildings do not have significant contamination or hazards, but need some level of decontamination, and Type 3 buildings have significant contamination and/or hazards. Different RFCA decision documents may be used to decommission each building type. The DPP serves as the RFCA decision document for Type 1 buildings, therefore, decommissioning activities are conducted in accordance with RFETS procedures upon notification of the LRA. Type 2 buildings require a separate RFCA decision document in the form of a Proposed Action Memorandum (PAM), Interim Measure/Interim Remedial Action (IM/IRA), or RSOP, or they may be included with Type 3 buildings in an approved DOP.

The decommissioning process begins with internal and external scoping meetings, at which the individual closure project points of contact from the Site and the LRA discuss the scope of the decommissioning project, including goals, schedule, budget, risks, controls, and overall project approach.⁸ Reconnaissance level characterization (RLC) identifies radiological, chemical, and physical hazards. The Reconnaissance Level Characterization Report (RLCR) summarizes the results of the RLC. The RLCR provides the basis for determining building types.

Additional characterization may be conducted during decommissioning as facility components are removed and building surfaces are exposed. This type of characterization is referred to as in-process characterization. Data from in-process characterization is used to identify additional hazards, refine approaches to facility component removal, size reduction, decontamination, and demolition, revise waste volume estimates, and modify ES&H controls, as necessary. In-process characterization is also conducted to determine the type and extent of decontamination, and to verify that decontamination has

⁵ RFETS Decommissioning Program Plan (DPP), Revision 1 (June 21, 1999)

⁶ RFETS Facility Disposition Program Manual (FDPM), MAN-076-FDPM, Revision 1 (September 24, 1999)

⁷ The Project Management Plan (PMP) will replace the Project Execution Plan (PEP) in the next revision to the FDPM.

⁸ The consultative process is described in Part 7 of RFCA (§§51-61) and in Section 1.1.1 of the DPP.

Table 2. Alternatives Analysis Summary

Alternative	Description	Effectiveness	Feasibility	Relative Cost
1- Decommissioning	Decommissioning activities will follow specific plans approved by DOE and the LRA. Activities include decontamination, as deemed necessary, equipment dismantlement, size reduction, and demolition of building structures.	Decommissioning is effective in achieving the long-term goals of RFCA. The mortgage costs are eliminated, and the risks and hazards are significantly reduced.	Technology currently exists to achieve the objectives of this alternative. Integration with other Site activities can be accomplished.	Immediate decommissioning results in the lowest life-cycle costs. Once decommissioning is achieved, minimal landlord costs are incurred.
2 - No Action	No Action will maintain the 771 Closure Project in its current configuration. No additional equipment would be removed unless the present safe shutdown status of the Cluster is compromised.	No Action delays closure activities that must be performed to meet the goals of RFCA. Deferring closure could make funding available to other Site closure activities. However, No Action could increase risk to workers and the environment if the integrity of the facility is jeopardized.	No Action would disrupt the long-term plans for RFETS.	No Action results in higher costs than immediate decommissioning, because landlord costs continue to be incurred until decommissioning begins.
3 - Reuse	Reuse of the 771 Closure Project would maintain the facilities in their current configuration. The Site Utilization Review Board would assign a new mission for the facilities, in support of the present Site cleanup mission. Depending on the nature of this mission, removal of equipment may be necessary. No changes would be made before definition of the new mission.	Reuse of the 771 Closure Project was evaluated by the RFETS Facility Use Committee, which determined there was no further mission for the Cluster. Use of the Cluster for an alternative off-Site use was evaluated in accordance with the RFCA Preamble (Objective #7), and DOE Order 430.1A. No further use was identified.	Because no new mission has been identified for the Cluster, implementation of this alternative is not administratively feasible.	This alternative results in the greatest life-cycle costs, because the reuse mission would more than likely require expenditures for modifications to the buildings in addition to existing landlord/surveillance costs. Furthermore, decommissioning costs (adjusted for future value) would still be required.

achieved the applicable decontamination goals and waste acceptance criteria (WAC) of contractor-approved treatment and disposal facilities. In addition, a final verification survey (referred to as a pre-demolition survey) is conducted before demolition to ensure that buildings have been sufficiently decontaminated to meet applicable performance specifications. Facility characterization activities are performed in accordance with the RFETS Decontamination and Decommissioning Characterization Protocol (DDCP)⁹, which defines the characterization process, and provides guidance for establishing appropriate data quality objectives and assessing data quality.

Figure 1 summarizes the relationships between RFETS Closure Project documents and drivers, individual closure project characterization packages, decision documents, and reports, including the use of various RSOPs. This figure shows the sequence of the major closure activities, including preparation of essential documents and interfaces between the elements of Site closure (i.e., decommissioning, and ER).

While the regulatory processes and documentation for decommissioning and ER are separate, these two major elements of facility closure interface at various points in the closure process and will sometimes occur concurrently in a building or building cluster. The Industrial Area (IA) Characterization and Remediation Strategy¹⁰ describes the interfaces within the IA. The interfaces apply to buildings identified as having under-building contamination (UBC) and/or contamination of surface and subsurface soils surrounding the building or building cluster. During component removal, size reduction, and decontamination activities, ER will characterize UBC and surrounding soils, as appropriate. The Environmental Restoration IA Sampling and Analysis Plan describes characterization activities. The UBC will be remediated before demolition. Section 4.5 contains additional information on the UBC remediation activity.

1.3 Scope and Purpose

The purpose of this DOP is to describe the decommissioning process for the Type 2 and 3 buildings within the 771 Closure Project. Building 771 is a Type 3 building, as discussed in the DPP. There are three Type 2 Buildings 714, 728, 770, 774, and 771C, and eleven Type 2 tanks. The remaining facilities in the 771 Closure Project are Type 1 facilities and are not included within the scope of this DOP. The current RLCR will be modified to address facility typing. The current RLCR did not address facility typing and was based on historical information. Sampling activities are currently being conducted and will be included in the RLCR revision.

⁹ Rocky Flats Environmental Technology Site Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP (latest revision)

¹⁰ Rocky Flats Environmental Technology Site Industrial Area (IA) Characterization and Remediation Strategy (in preparation)

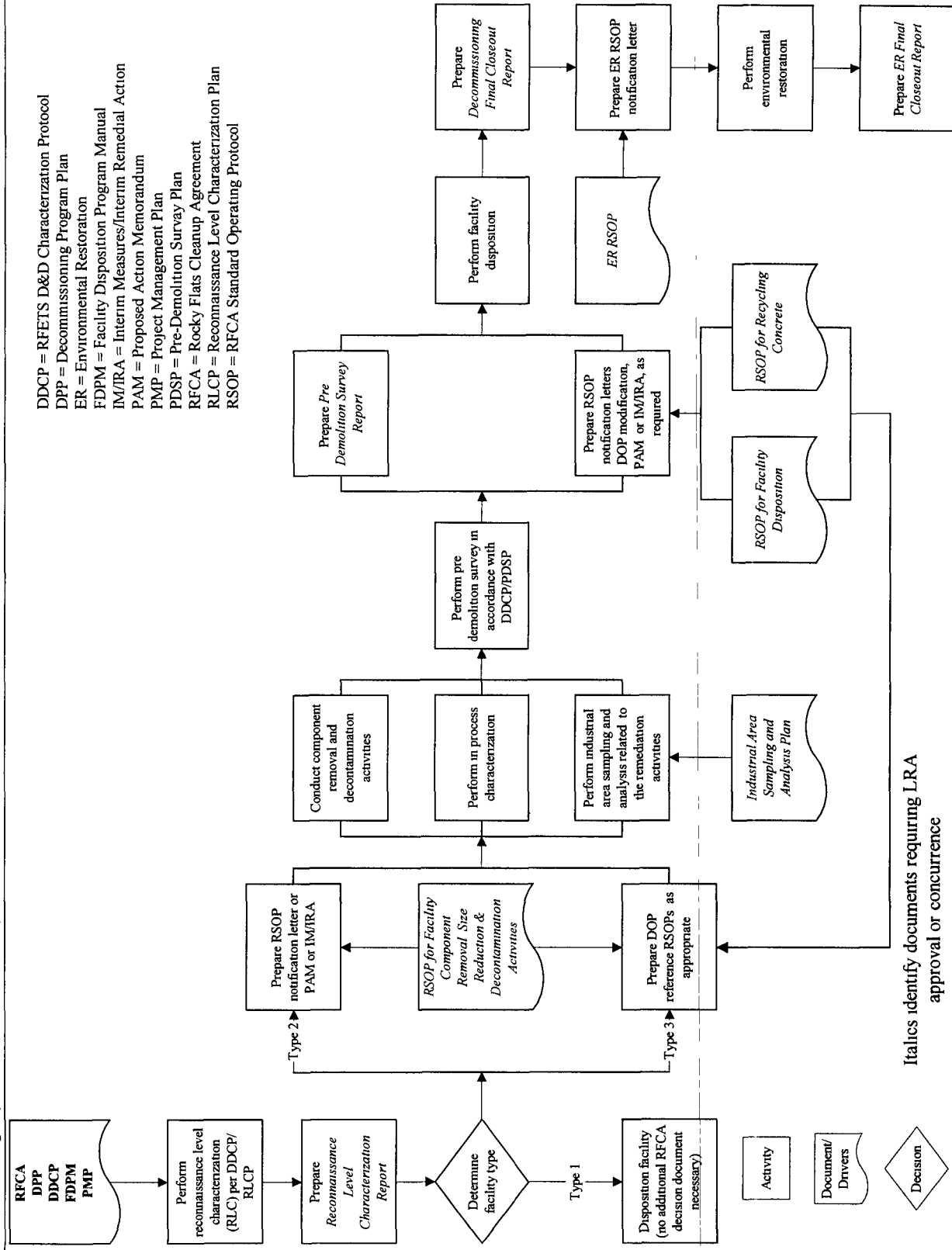


Figure 1. Major Closure Activities & Associated Documents

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2 PROJECT ORGANIZATION

This section provides a brief description of the 771 Closure Project organization structure, functions, and interfaces as they pertain to facility management and decommissioning. This information identifies reporting relationships and responsibilities. The organizational structure is not an enforceable part of the DOP. DOE or its contractor may alter the structure without prior notification to or approval of the LRA, and without modifying the DOP. Significant organization changes (e.g., management-level changes) will be shared with the LRA as part of the RFCA consultative process.

2.1 Project Team Organization Structure

The 771 Closure Project will function under an integrated scope, schedule, and cost control system that identifies roles, responsibilities, and interfaces. Figure 2 as described below, depicts the project organization.

- **771 Closure Project Management** – Accountable for the safe planning and execution, and the successful completion of the 771 Closure Project in accordance with applicable standards and requirements
- **Environment, Safety, Health & Quality** – Provides program, policy, and regulatory guidance, performs inspections, manages radiological operations, coordinates assessments, collects, tracks, and trends Closure Project ESH&Q metrics, and provides engineering services and planning support to the Closure Project team
- **Administrative Services** – Provides support in the area of human relations and labor relations, assists the Closure Project Manager in resource allocation planning, manages the 771 Closure Project training program, administers the employee compensation program, prepares Closure Project occurrence reports, and provides miscellaneous project administrative support (e.g., document preparation, control, and maintenance and records management)
- **Project Planning/Controls** – Develops Closure Project schedules, identifies resource requirements, maintains the PMP, manages the Closure Project change control process, monitors and reports Closure Project performance, manages work control, including plan of the day (POD) and plan of the week (POW), administers subcontracts and task orders, and purchases equipment and supplies required to support Closure Project activities
- **Environmental Compliance** – Represents the project to the regulatory agencies, implements environmental stewardship requirements, and represents the project on Site-wide committees
- **Operations Management** – Operates and maintains the 771 Closure Project to support Closure Project activities, ensures compliance with the Building 771 Basis for Interim Operations (BIO), maintains facility safety category systems (e.g., criticality, fire, ventilation), releases/authorizes work, conducts facility surveillances, maintains facility security, manages facility emergency preparedness, conducts RCRA inspections, and maintains RCRA compliance. Accountable for deactivation activities, decommissioning, and material stewardship activities.
 - **Deactivation** Responsible for the removal of SNM holdup and “loose” equipment and materials, such as combustibles, furniture, and waste chemicals, preparation of gloveboxes for decommissioning, removal of organic liquids from equipment and systems, removal of classified material/tooling, and removal glovebox line- and non-line generated material

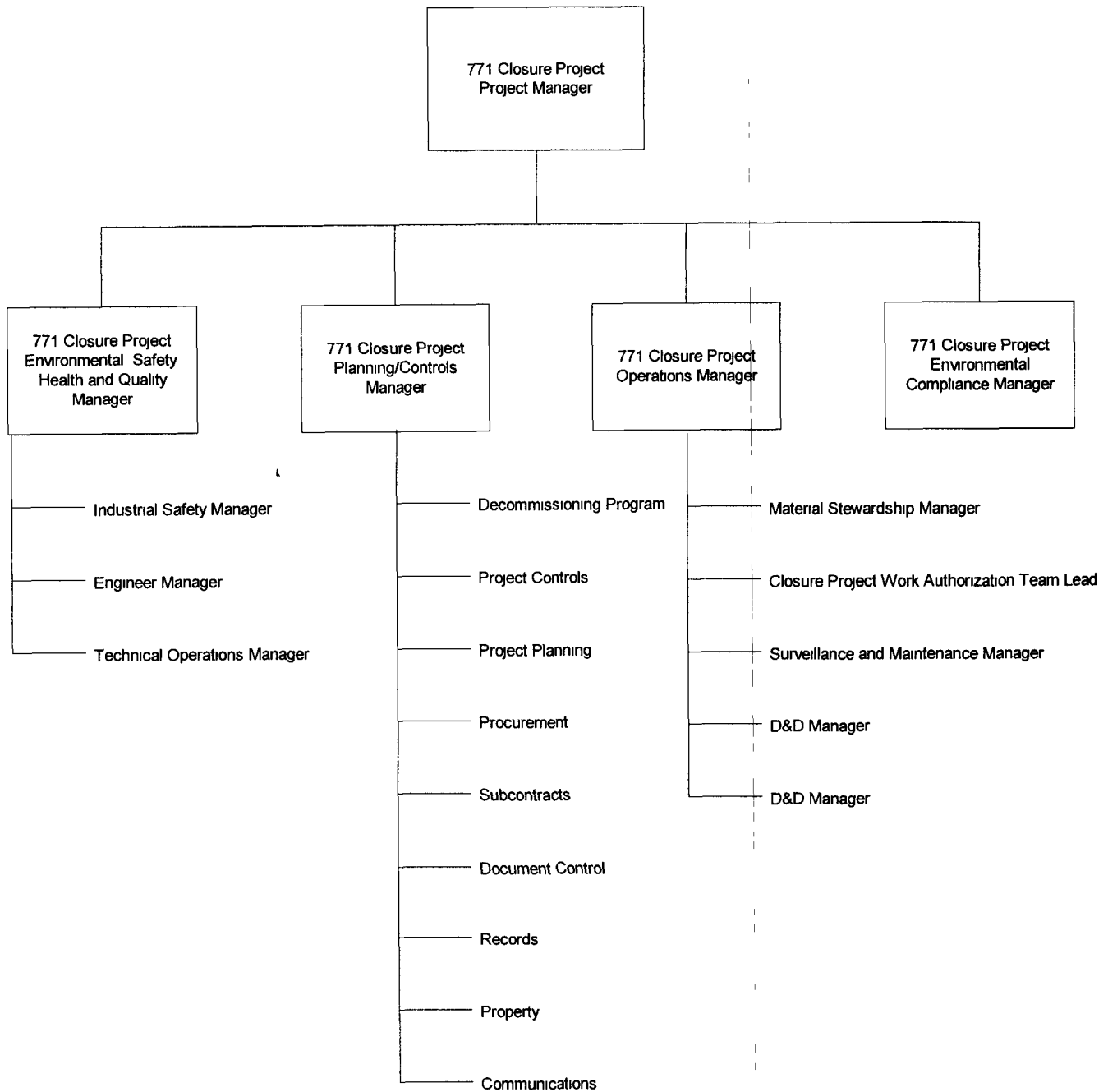


Figure 2. 771 Closure Project Organization

- Decommissioning Responsible for the removal, size reduction, and decontamination of facility components and for facility demolition as described in this DOP
- Material Stewardship Provides commodities to support Closure Project needs, manages wastes and coordinates inter-building material movements through facility disposition, provides nuclear material safeguards support (e.g., SNM inventory, assay, and accounting), and provides non-destructive assay services

2.2 DOE and LRA Interfaces

As owner of the Site, DOE oversees closure operations, provides direction to the contractor regarding funding and overall direction, and communicates with the regulators and other stakeholders (e.g., the Rocky Flats Citizens Advisory Board [RFCAB], the Rocky Flats Coalition of Local Governments [RFCLOG], and the public) regarding the status of the 771 Closure Project. In addition, DOE is responsible for the enforcement of health and safety provisions of certain federal regulations.

CDPHE is the LRA for the IA, and thus is the LRA for decommissioning activities conducted pursuant to RFCA. EPA is the Support Regulatory Agency in the IA, so both CDPHE and EPA participate in oversight of decommissioning activities at RFETS. Both CDPHE and EPA have executed a Memorandum of Understanding (MOU) with DOE to define their respective roles and responsibilities for oversight of activities conducted in the IA.¹¹ In that portion of the Site where each is the LRA, CDPHE and EPA have authority to direct DOE to stop work or perform particular tasks required under RFCA when conditions present an immediate risk to public health or the environment.

2.3 Working Relationships

The personnel of DOE, its contractor, subcontractors, CDPHE, and EPA will use the RFCA consultative process¹² to establish and maintain effective working relationships with each other and with the public throughout the decommissioning process. As described in the DPP, the principal aspects of the consultative process are as follows:

- **Timely Sharing of Information** – Information sharing activities will include but need not be limited to updates of the overall Site CPB, briefings on the development of work plans, briefings on changes to the approved baseline, standing invitations to project planning meetings and pre-evolution briefings (PEBs), and consultations on decommissioning strategy.
- **Collaborative Discussions of Program Changes** – The goal of these collaborative discussions is to raise and resolve issues without delaying decommissioning activities.
- **Designation and Use of Project Points of Contact for Information Exchange and Resolution of Issues** – The LRA, DOE, and the contractor will designate points of contact to facilitate open communication and resolution of issues.
- **Respect for the Roles and Responsibilities of the Parties** – The LRA and DOE will have distinct roles and independent decision-making responsibilities. In general, the role of DOE is to oversee program and Closure Project planning, and to approve the CPB and baseline changes. The role of the LRA is to approve the DOP and other RFCA decision documents, oversee the planning and implementation of work, ensure protection of human health and the environment, and monitor compliance with RFCA and Closure Project ARARs.

¹¹ Memorandum of Understanding Governing Regulation and Oversight of Department of Energy Activities in the Rocky Flats Environmental Technology Site Industrial Area (IA), executed February 15, 1996.

¹² The consultative process is described in §§51-61 of RFCA, in Appendix 2 of RFCA, and in Section 1.1.1 of the DPP.

- **Training** – To facilitate the consultative process, the LRA and DOE may develop and provide training to their respective staff and to the contractor, subcontractors, and interested members of the public

Per RFCA, CDPHE is the LRA for decommissioning activities under CERCLA¹³ To expedite the decommissioning process, the parties have agreed the LRA may exercise authority by participating in the IWCP process For the purposes of this DOP, this means the LRA has an opportunity to discuss issues and ask questions, but it does not mean the LRA has approval authority for IWCP work packages DOE and its contractor or subcontractors will advise the LRA of IWCP meetings and roundtable review sessions, and will provide relevant information in a timely manner The LRA, DOE, and the contractor or subcontractors may use these roundtable review sessions as a forum for RFCA consultation If this process does not address the LRA's concerns, the LRA may issue a "stop work" order pursuant to RFCA¹⁴

¹³ See RFCA ¶70

¹⁴ See RFCA (¶¶176-180)

3 771 CLOSURE PROJECT DESCRIPTION

The 771 Closure Project is comprised of Building 771 and various support facilities located within the Site's IA. Figure 3 shows the 771 Closure Project and some facilities surrounding the Project. Not all of the facilities within the 771 Closure Project are annotated on the drawing, and not all of the facilities annotated on the drawing are part of the 771 Closure Project. The following sections provide a descriptive overview of the 771 Closure Project.

3.1 Building History and Description

Building 771 is located in the north-central section of RFETS. The building is predominantly constructed of reinforced concrete with some non-production portions of the building constructed of concrete block and fabricated metal. The original building was a two-story structure built into the side of a hill with most of the three sides covered by earth. The fourth side, facing the north, provides the main entrance to the building. The original building measures 262 feet (north to south) by 282 feet (east to west) on the ground floor and 202 feet by 282 feet on the second floor. The building is 31 feet tall, and there are no outside windows in the main building.

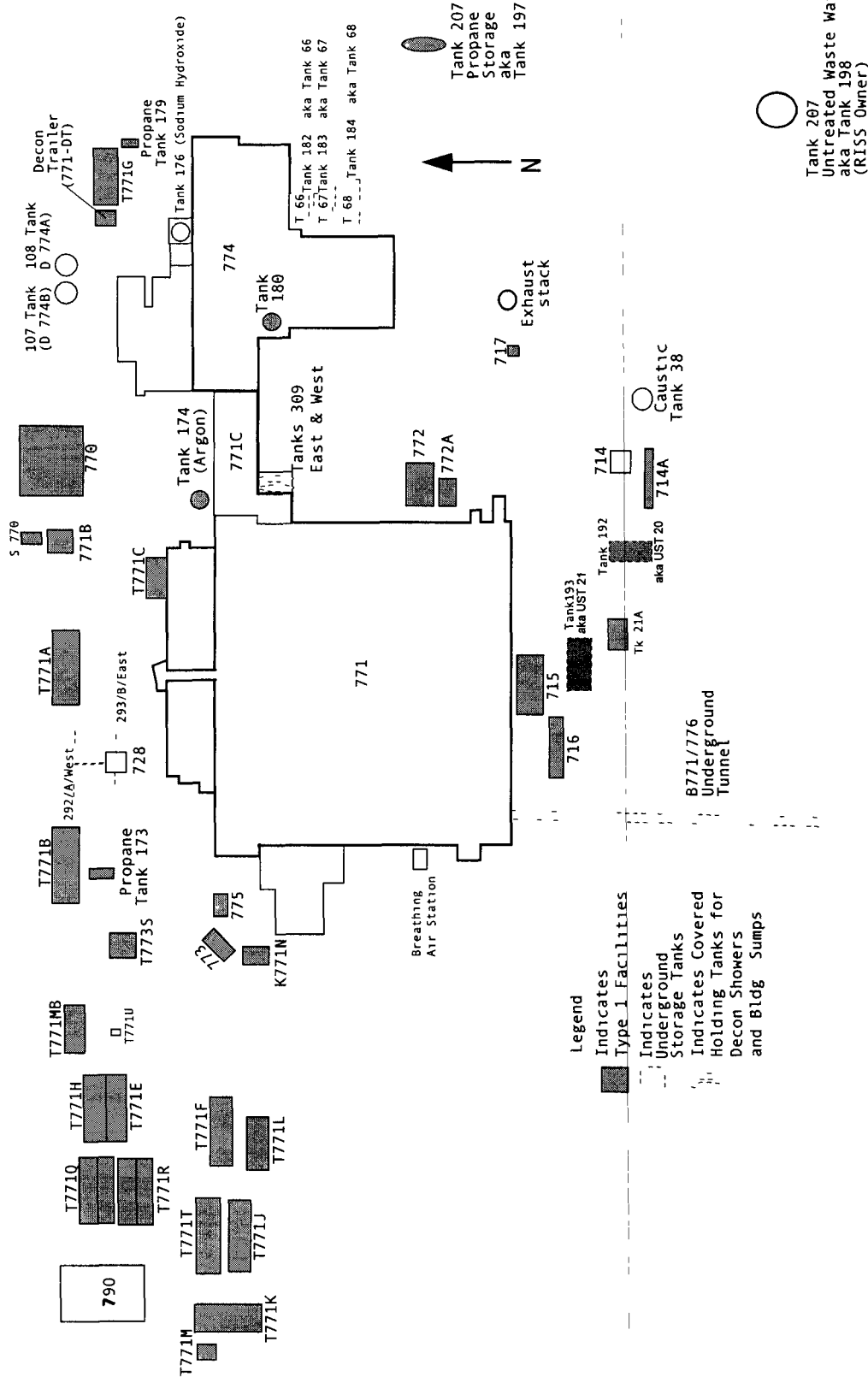
Since completion of the original building, six major additions have been constructed. This series of expansion brought the total area of the building to approximately 151,000 square feet. The first addition was Building 771A, which was constructed in 1962. It is a one-story structure, approximately 41 feet by 110 feet on the north side of the main building. Offices and the cafeteria were moved into Building 771A when it was completed. This addition is separated from the process areas by a hallway and doors, and has a separate ventilation system. Completed in 1966, the 771B office addition is a one-story building, measuring 41 feet by 81 feet. The addition was built on the north side of the main building, west of 771A. The Dock Number 1 addition was added to the northwest side of the main building in 1968. The maintenance shop on the west side of the main building was constructed in 1970. The maintenance shop is 60 feet by 77 feet. The waste packaging facility, Building 771C, was built in 1972, and is a one-story addition to the east side of Building 771, extending to the west side of Building 774. Building 771C was used to store, count, and ship waste; waste packaging and repackaging occurred within Building 771.

A plenum deluge catch tank shed, built in 1974, was added on the west side of the original building adjacent to the maintenance shop addition. It is a one-story, 24 feet by 30 feet shed. Inside the shed is a 4,000-gallon capacity filter drainage catch tank and support system to collect the water used while fighting a fire inside the filter plenums or incinerator.

Building 771, the primary facility for plutonium operations, was one of the four major buildings to be constructed and placed in operations at RFETS. Building 771 operations included the chemical and physical operations for recovering plutonium and refining plutonium metal, plutonium chemistry and metallurgical research, and a radiochemical analytical laboratory. The following provides a chronology of Building 771.

- | | |
|------|---|
| 1951 | Construction begins in November |
| 1952 | Building 771 is occupied |
| 1953 | The first operations begin in May |
| 1957 | On September 11, a glovebox fire occurs in the building, resulting in the transfer of a plutonium foundry, fabrication, and assembly operations to Building 776/777 |
| 1958 | A plutonium recovery incinerator begins operations |
| 1959 | The solvent extraction process for plutonium recovery is replaced with an anion exchange process |

Figure 3. 771 Closure Project Facilities



- 1963/64 Building 771A is constructed to increase plutonium production. Processes were expanded to include an americium recovery line, dissolution lines, filtrate recovery, and batching, calcination, and fluorination operations.
- 1967 An office expansion, 771B, is added to Building 771.
- 1970 An addition is completed on the west side of the building to consolidate all maintenance, pipe, sheet metal, and painting activities.
- 1971 Building 771C, a drum-handling facility, is completed.
- 1979 Plutonium recovery operations in Building 771 are discontinued. Cleanup operations begin in Building 771.
- 1980 Building 771 operations are restarted due to material accountability problems in Building 371.
- 1989 Building 771 plutonium operations are shut down in November as part of an overall plutonium operations shutdown ordered by DOE.

Building 771 Stack is a reinforced concrete stack at the southeast corner of Building 771. The stack has an inside diameter of 10 feet, the base underground is 19 feet across, and the stack rises 150 feet aboveground. The stack wall is 6 inches thick at the top and 11.5 inches thick at the base. The stack provides exhaust for the main filter plenum, which receives exhaust from the high-efficiency particulate air (HEPA) filtration system, the heating, ventilating and air conditioning (HVAC) system, and the incinerator.

Building 774 was designed to treat the liquid process wastes generated in Building 771. Building 774 was originally a two-story rectangular structure of poured-in-place concrete. By 1989, seven additions had been made to the building, resulting in multiple levels varying from one to four stories in height. The additions are constructed of block wall, reinforced concrete, metal-on-metal framing and transite. Because of the additions, floor space increased to 25,000 square feet. The facility is built on a steeply sloping site. The first floor on the north side is 7.5 feet below-grade, and the fourth floor on the south side is 4 feet above-grade.

As RFETS expanded to accommodate increased production of nuclear weapon triggers, Building 774 began processing radioactive acidic and caustic wastes, aqueous and organic wastes, waste oils, and non-radioactive waste photographic solutions. Buildings 111, 112, 130, 371, T371J, 441, 444, 460, 551, 559, 664, 707, 750, 771, 776, 777, 881 and 991 generated one or more waste streams that were processed in Building 774. In 1971, the waste treatment operations in Building 774 were enclosed to provide containment of radioactive airborne particles.

The goal of the Building 774 waste treatment process was to reduce liquid radioactive wastes and convert them into a form suitable for transport off-site for storage and disposal. In general, wastes were either piped directly into Building 774, or transferred in drums, containers, or other types of packaging. The waste entered a series of interconnected tanks designed to treat acidic, caustic and radioactive wastes and separate relatively low-level radioactive effluent from contaminated solids or sludges. Each of the four processes used in the building were tailored to meet certain characteristics of the waste. The waste may have passed through one or more of the following processes:

- Neutralization and filtration of acidic wastes containing large quantities of metal ions or chloride ions. The main purpose of this process was to remove the large quantities of metal hydroxide solids from the waste stream, as these solids hampered the decontamination ability of the succeeding flocculation and clarification processes.
- Batch neutralization, precipitation and filtration of acidic wastes containing only small quantities of metal ions or basic wastes containing large quantities of undissolved solids,
- Continuous radioactive decontamination of neutral and caustic wastes, and

- Solidification of aqueous wastes containing complexing agents, certain radioactive isotopes, or hazardous chemicals that were undesirable in the regular waste system. These wastes were mixed with an absorbent material and Portland cement in barrels for disposal. This process was eventually replaced by the organic and sludge immobilization system. The organic and sludge immobilization system accepted waste oils from any building at the Site that contained transuranic material and converted the liquid waste into solid waste.

The second stage of the decontamination process included two separate radioactive waste decontamination processes. The benefit of segregating the wastes was better utilization of the waste storage ponds based on whether the wastes met standards for radioactive and/or chemical contamination.

The slurry from the decontamination process was held in a slurry tank until it was processed by vacuum filtration to separate the solids from the liquid. The separated solids were mixed with a solidifying agent, and packaged for shipment and long-term storage as transuranic-mixed waste.

The role of Building 774 diminished with the inauguration of the new process waste treatment facility in Building 374. Building 774 continued to process contaminated organic wastes that could not be incinerated, and the liquid process wastes generated in Building 771.

Building 728 was constructed as a sewage lift station with two 25,000-gallon below-grade holding tanks (tanks 292 and 293) for surge purposes, and is located approximately 35 feet north of the west half of the Building 771 office addition. The overall structure of the building is constructed primarily of cast-in-place concrete. The portion of the building that is visible above grade is approximately 7 feet by 15 feet and extends 4.5 feet above adjacent grade. The remainder of the structure extends approximately 12 feet below grade and occupies a footprint of 33.5 feet by 24.5 feet.

3.1.1 System Interfaces

A number of systems are connected to the 771 Closure Project and other facilities on site. The connections will be considered as closure activities are planned, and actions will be taken to prevent unexpected disruption of services. The following bullets detail the systems:

- Electrical - connected to the 515/516 Substation
- Nitrogen - connected to the Nitrogen Plant
- Argon - connected to a tank outside the facility
- Plant Air - received from Building 776
- Breathing Air - received from Building 707/708
- Criticality System - connected to the plant-wide system
- Water - received from Building 124
- Steam - received from Building 443
- Sanitary Sewer - connected to the plant-wide system
- Liquid Process Waste - connected to the plant-wide system
- Natural Gas - connected to the plant-wide system
- Telephone System - connected to the plant-wide system
- Fire Protection Systems - connected to the plant-wide system
- Security Protection Systems - connected to the plant-wide system
- Grounding/lightning system - interconnects Building 771, Building 715 and Building 774

3 1 2 Physical Interfaces

Three reinforced concrete box tunnels connect Building 771 to other structures

- A 267-foot tunnel connects Building 771 to Building 776 for purposes of moving materials. The tunnel measures 8 feet by 10 feet by 267 feet. The tunnel has a 6% grade. The walls and roof are 1 foot thick, and the floor is 1.25 feet thick.
- A 170-foot utility tunnel connects Building 771 to Building 774. The tunnel measures 3.5 feet by 3.5 feet by 170 feet.
- A 140-foot exhaust duct tunnel connects Building 771 to the exhaust stack (measures 8 feet by 10 feet by 104 feet). The exhaust tunnel floor is 1 foot thick, and the walls and roof slab are 10 inches thick.

3.2 Current Status

Decommissioning and deactivation activities are proceeding in parallel in Building 771, along with routine maintenance and housekeeping. The stripout of process equipment is well underway. The first group of sets stripped-out freed up floor-space needed for additional size-reduction equipment and staging for decommissioning. These sets were Set 7, Set 25, Set 32, Set 34, Set 37, Set 40, Set 42, and Set 44. Decommissioning proceeded with sets having low contamination levels. Set 35, Set 38A, Set 39, Set 41, Set 46, and Set 50. Decommissioning of these sets is complete and represents about a third of the Building 771 ground floor process area.

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4 PROJECT APPROACH

The decommissioning cost and schedule planning process for the 771 Closure Project has been completed, and the costs and schedules are included in the RFETS Closure Project Baseline (CPB). During the course of the 771 Closure Project, there may be instances where circumstances differ from those predicted. In such cases, planned activities may be revised without revising the CPB or DOP, if the activities are still within the scope of this DOP and the referenced RSOPs. Significant changes will be shared with the LRA and stakeholders as part of the RFCA consultative process.

4.1 Work Planning and Execution

Decommissioning activities will be planned and executed in accordance with the RFETS Integrated Safety Management (ISM) System, as described in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*.

4.2 771 Closure Project Characterization

The 771 Closure Project characterization involves a three-step approach: scoping characterization, RLC, and in-process characterization. The following paragraphs describe each step in more detail. The pre-demolition survey information is documented in Section 4.6. Under building pre-remediation characterization is addressed in Section 4.5.3 and a separate sampling and analysis plan will be developed for the pre-remediation characterization activities.

4.2.1 Scoping Characterization

During scoping characterization, existing records and documents were collected, and present and former Building 771 employees were interviewed to determine the radiological, chemical and physical conditions of the Cluster. Based on the information collected, the 771 Closure Project team proceeded to conduct the RLC.

4.2.2 Reconnaissance Level Characterization

The purpose of RLC is to identify the location and extent of radiological, chemical and physical hazards associated with a facility. The RLC for the 771 Closure Project was completed in August 1998. The RLCR documents results for the 771 Closure Project. Hazards were assessed based on a review of historical records and process knowledge. The RLCR did not contain detailed information on the facilities exterior to Buildings 771 and 774, therefore, the RLCR¹⁵ will be amended and submitted for concurrence on those facilities.

Potential physical hazards within the 771 Closure Project consist of those common to standard industrial environments, including hazards related to energized systems, utilities, gas cylinders, trips and falls, and forklift operations. The buildings have been relatively well maintained and are in good physical condition. Consequently, there are no unique physical hazards associated with any of the buildings within the 771 Closure Project.

¹⁵ This RLCR is being prepared in parallel to this DOP modification and should receive LRA concurrence during the public comment period. The draft report and data packages are available in the administrative record file.

4 2 3 In-Process Characterization

Additional characterization will be conducted during decommissioning, as facility components are removed and building surfaces are further exposed. This type of characterization is referred to as in-process characterization. Data from in-process characterization is used to identify additional hazards, refine approaches to component removal, size reduction, and decontamination, revise waste volume estimates, and modify ES&H controls, as necessary. In-process characterization is also conducted to verify that decontamination activities have achieved the applicable performance specifications, such as release or reuse criteria and WAC. Detailed information regarding the characterization process and associated requirements is contained in DDCP¹⁶.

4.3 Dismantlement Sets and Decommissioning Areas

The decommissioning work is broken down into Dismantlement Sets and Decommissioning Areas. In general, Steelworkers complete Dismantlement Sets, and Building Trades complete Decommissioning Areas. Steelworkers conduct work on highly contaminated systems with removal contamination greater than 2,000 disintegrations per minute (dpm). Building Trades generally work in Areas with removable contamination less than 2,000 dpm, unless some ventilation remains in place by the Steelworkers to maintain differential pressure.

4 3 1 Dismantlement Work Set Descriptions

The following table indicates the Set number and a brief description of those Sets. The Sets were established for dismantlement activities. Dismantlement sets include scope to remove process equipment and associated items, but leave in place elements needed for safety and convenience of the workers performing activities in the Areas. For example, fire suppression and alarm systems, ambient lighting, domestic water, sanitary drains, and various tools are among the items that may be left in place after dismantlement. Dismantlement consists of planning, disassembly and removal of equipment components and satisfactory packaging for disposal of the resulting waste. Although the Set descriptions indicate piping, conduit, and ventilation will be removed, there may be some instances where miscellaneous equipment and/or piping, conduit, and ventilation remain for the following reasons:

- It meets the unrestricted release criteria,
- There are no advantages to removing the equipment,
- Due to logistics in the Set, the equipment can be more readily removed during the Area decommissioning, and/or
- The equipment is necessary for safety or coordination reasons.

If equipment is not removed for any of the four reasons stated above, the Set will still be considered complete for dismantlement purposes.

Table 3. Set Descriptions

Set	Description
12	This Set involves the removal and packaging of gloveboxes 8, 8e, and 9, the equipment inside the gloveboxes, and minor external items. Piping, conduit, pneumatic transfer lines, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes.

¹⁶ Rocky Flats Environmental Technology Site Decontamination and Decommissioning Characterization Protocol (M AN-077-DDCP), latest revision

Table 3. Set Descriptions

Set	Description
22	This Set involves the removal and packaging of gloveboxes 33, 37, 38, and 39 and tanks 5, 176, 177, 630, and 631. In addition, equipment internal to these gloveboxes and tanks will be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
27	This Set involves the removal and packaging of glovebox 30 and tanks D-203, 204, 205, 206, 207, 208, 218, and 219. Items internal to these gloveboxes and tanks, and minor external equipment will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
36	This Set involves the removal and packaging of gloveboxes MT-1, MT-2, MT-3, MT-4, MT-5, MT-6, MT-7, and Tanks 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1019, 1020, 1013, 1014, 1022, 1023, 1024, 1032, 1033, 1050, 1053, 1062, 1063, 1064, 1065, 1066, 1067, 1069, and 1073. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
38	This Set involves the removal and packaging of gloveboxes 201, 205, 206, 207, 208, 209, 213, 214, 215, 221, 223, 224, 225, 227, 228, 241, and 242, and tanks 430 and 431. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
43	This Set involves the removal and packaging of gloveboxes A-10, 20, 30, 31, 32, 51, 52, 53, and D-2, and tanks D-2, 1803, 1804, 1805, 1807, 1809, 1810, 1811, 1813, 1816, 1817, 1818, 1819, T-5, 6, 7, 8, 21, 22, 25, and 26. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
60	This Set involves the removal and packaging of gloveboxes 1 North and 1 South and associated equipment inside the gloveboxes. Tanks 705, 706, 713, 714, 715, 716, 764, and 765 will be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes.
61	This Set involves the removal and packaging of gloveboxes 3, 4, 5A, 9A, 22, 5, 11, 14 (new), 12, 13, 14 (old), 15, 16, 16A, 17, and 18. Tanks 7 (mist tank), 6, 967, 548, 549, 550, 551, 552, 609, 610, 509 (new), 510 (new), 529, 530, 547, 548, 553, 554, 949, 950, 951, 952, 953, 954, 955, 500, 501, 502, 503, 504, 505, 506, 509, 510, 544, 545, 70, 71, 72, and 73 will also be removed. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, pneumatic transfer lines, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
62	This Set involves the removal and packaging of gloveboxes 6, 7, and 7A. The equipment inside the gloveboxes including Nash pump, Hydrofluorinator, and Scrubber will be removed. Piping, conduit, pneumatic transfer lines, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes.
63	This Set involves the removal and packaging of glovebox SR-11 and SR-12, and equipment internal to these gloveboxes. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
64	This Set involves the removal and packaging of the Contamination Control Cell and its associated equipment inside the cell. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the cell.
65	This Set involves the removal and packaging of gloveboxes 43A, 43B, 43C, and 43D, and associated equipment inside the glovebox. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes.
66	This Set involves the removal and packaging of gloveboxes 23, 24, 25, 26, 29, 31, 50, 40, 44, and 42. Tanks 928, 979, 980, 981, 982, D360, 361, 362, 363, 364, 920, 921, 922, 923, 927, 78, 79, 451, 452, 453, 454, 456, 457, 466, 467, 468, 469, 470, 472, 971, 972, 973, 974, 975, 976, D-931, 932, 933, and 934 will also be removed. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.

Table 3 Set Descriptions

Set	Description
67	This Set involves the removal and packaging of gloveboxes 153A, 153B, 153C, 153D, and 153E, hot cells HC1, HC2, HC3, HC4, HC5, and HC6, and tanks T-3, T-4, 86, 87, 88, and T-153E. Equipment internal to these gloveboxes, hot cells, and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
68	This Set involves the removal and packaging of gloveboxes A-1, A-2, A-3, A-4, and 1097 and a hood, and tanks 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1090, 1095, and scrubber 1089. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
69	This Set involves the removal and packaging of gloveboxes E-10, 11, 20, 30, 31, 32, 50, 51, K-10, 20, 30, 50, F-60, 70, 70A, and B-boxes F-20 and F-30, and tanks 80, 81, 82, 83, 84, 85, and scrubber K-30. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
70	This Set involves the removal and packaging of tanks 309 East and 309 West. Piping, conduit, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes and tanks.
71	This Set involves the removal and packaging of items from the hallways in the limited area, primarily piping and glovebox exhaust piping. To support the release of areas for work, the hallways may be dismantled in two campaigns, east and west.
72	This Set involves the removal and packaging of glovebox exhaust piping from the west side of Building 771, first floor.
74	This Set involves the removal and packaging of Plenum FU-1E, its internal HEPA filters and pre-filters, and the exhaust fans.
75	This Set involves the removal and packaging of Plenum FU-1, its internal HEPA filters and pre-filters, and the exhaust fans.
76	This Set involves the removal and packaging of the Plenum FU-2A, FU-2B, and FU-2C, internal HEPA filters and baffle plates, and the exhaust fans.
77	This Set involves the removal and packaging of the Incinerator Filter Plenum, its internal HEPA filters, and the exhaust fans.
78	This Set involves the removal and packaging of the <u>first stage</u> of HEPA filters and the contaminated metal framework and sheetmetal in the main exhaust plenum and Tank V-2 in Room 190.
82	This Set involves the removal and packaging of a size reduction workstation that was installed in Room 149 to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The Containment Tent, Inner Tent Demolition Chamber, tools and fixtures, Dust Collector, and Air Movers will be removed and packaged for disposal. Piping, conduit, and ventilation ducting from the workstation will also be removed.
83	This Set involves the removal and packaging of a size reduction workstation that was installed in Room 181A to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The Containment Tent, Inner Tent Chamber, tools and fixtures, Air Handling Units, and Duct Collector will be removed and packaged for disposal. Piping, conduit, and ventilation ducting from the workstation will also be removed.
84	This Set involves the removal and packaging of a size reduction workstation that was installed in Room 183 to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The containment tent, inner tent chamber, tools and fixtures, and air movers will be removed and packaged for disposal. Piping, conduit, and ventilation duct from the workstation will also be removed.
91	The Set involves the removal and packaging of equipment in Building 774 Rooms 202 and 203 including gloveboxes 6, 7, 8, and 17, tanks T42, T1A, TIRF, T-2F, T4L and T4R, T 70, T71, T73, and F-5. Sludge in the tanks will also be removed and packaged. The associated items inside and outside the gloveboxes will also be removed and packaged for disposal. Piping, conduit, and ventilation duct will be removed.

Table 3. Set Descriptions

Set	Description
92	This Set involves the removal and packaging of equipment in Room 210 including gloveboxes 1, 2, 4, 15, 206, Oasis glovebox and the Microwave glovebox, and tanks T1, T2, T7, T8, T13, T14, T374A, NDT1232, NDT1234, and the Condensate Receiver, and Filter Plenum 210. Sludge will also be removed and packaged. Piping, conduit, and ventilation duct will be removed.
93	This Set involves the removal and packaging of equipment in Rooms 102 and 103, including gloveboxes 9, 10, 11, 12, and 13, tanks SP2, 210A, T9, T10 and T12, T74, C1, T11L and T11R, D351, a caustic storage tank, and (new) T40, and other items located in the room. Sludge that remains in the tanks will also be removed and packaged. Piping, conduit, and ventilation ducting will be removed. Sludge will also be removed and packaged. Piping, conduit, exhaust fans and ventilation duct will be removed.
94	This Set involves the removal and packaging of equipment in Rooms 220 and 320 including Filter Plenum 203 and associated HEPA filters and demister, and other items located in the rooms.
95	This Set involves the removal and packaging of plenums FP-201 and FP-202 and several large tanks T-201, T-202, T203, T-204, and (old) T-40, along with their associated equipment and other items located in the building. Sludge in the tanks will also be removed and packaged. The equipment that pumps waste and groundwater from building sumps to Building 374 is included in this Set. Remaining piping, conduit, and ventilation duct throughout Building 774 will be removed.

4.3.2 Decommissioning Areas

The following table indicates the Area designation and a brief description of those Areas. The Areas involve decontamination, dismantlement, and demolition activities. Some miscellaneous equipment may remain in the Areas after decontamination, component removal, and size reduction because it meets the unrestricted release criteria, and there is no reason to remove it.

Table 4. Area Descriptions

Area	Description
AA	This Area involves the corridor B office area and corridor F office area. Corridor B office area includes corridor B and offices 116, 117, 117A, 118, 118A, 119, 119A, 119B, 119C, 119D, 124, 125, 125A, 125B, 125C, 125D, 125E, 126, 126A, and 126B. Corridor F office area decommissioning includes rooms 103, 104, 105, 105A, 105B, 107, 109, 110, 110A and 110B, corridor F, and a criticality alarm panel. The activities associated with the Area decommissioning include the removal of utilities piping, remaining ventilation systems, interior partitions, and drop ceilings, decontamination, and the demolition of the office building structure.
AB	This Area includes rooms 301, 302, 303, 304, 305, 306 and 308, drum counters, scales, exhaust fans, and motors. The activities associated with the Area decommissioning include dismantlement of the annex area, removal of utilities piping, remaining ventilation systems, interior partitions, and drop ceilings, decontamination, and the demolition of the annex building structure.
AC	This Area includes rooms 120, 122, 123, 123B, 123C, 133 and 135, the men and women's locker rooms, the janitor's closet, and the laundry cage in the men's locker room. The activities associated with the Area decommissioning include dismantlement of the locker room area, removal of utilities piping and remaining ventilation systems, and decontamination.
AD	This Area includes rooms 129, 129A, 129B, 129C, 129D, 129F, 130, 131, 132, and 132A, Dock 2, and unwanted machine tools. The activities associated with the Area decommissioning include dismantlement of the 129 maintenance area, removal of utilities piping, remaining ventilation systems, interior partitions and drop ceilings, decontamination, and the demolition of the Annex building structure.

Table 4. Area Descriptions

Area	Description
AE	This Area includes room 157. The activities associated with the Area decommissioning include dismantlement of the 157 stock room area and removal of utilities piping, remaining ventilation systems, interior non-load bearing CMU, and drywall partitions. Interior surfaces will have paint removed to facilitate pre-demolition survey (PDS). In-process characterization will identify areas of surficial contamination, and surface decontamination will remove surface contamination. An estimated 25% of floor slabs will be removed during decontamination activities.
AF	This Area includes rooms 135A, 135B, 141, 151, 151A, 151B, 151C, 151E, 151F, and 152, the elevator area, 151 radiation control area, the RCT areas, SAAM panel, and decontamination showers. The elevator area includes rooms 142, 145, and 242, electrical control panel, elevator cage, and hydraulic unit. The activities associated with the Area decommissioning include the removal of utilities piping, remaining ventilation systems, interior non-load bearing CMU, and drywall partitions. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. Floors will be removed from rooms 114, 141, and 149. Walls and the ceiling will also be removed in room 141.
AG	This Area includes the Building 771 stack, Building 771 stack tunnel, Building 776 tunnel, and Building 774 tunnel. The activities associated with the Area decommissioning include the removal of stainless steel liner in the 771 stack tunnel, Building 776 tunnel, and Building 774 tunnel, utilities piping, remaining ventilation systems and disposition. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination.
AH	This Area includes room 283 east, exhaust unit S-8, air handling unit AHU-2, and exhaust fans #5 and #6. This area also includes rooms 283A, 283B, 283H, 283I, 283J, and 283 center and exhaust fans #2, #3, and #4. The west 283 HVAC exhaust and utilities area includes rooms 283C, 283D, 283E, 283F, 283G, and 283 west, air handling unit AHU-3, exhaust fan #1, and the uninterruptible power supply (UPS) battery system. The activities associated with the Area decommissioning include the removal of utilities piping and remaining ventilation systems. Interior surfaces will have paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. In addition, the activities associated with the Area decommissioning include the removal and packaging of equipment on the Building 771 second floor except the plenums (see sets 74 through 78 for plenums scope). The second floor equipment includes the main supply plenum, test plenum, fans from the filter plenums, bag-filters, air-washers, deep-bed filters, knock-out, and condensate tanks. Control panels, transformers, electrical switch gear, motors, pumps, various instruments, racks, and various tools such as portable lights, welders, ladders, air movers, tool boxes, dollies, cabinets, desks, lockers, and other items will also be removed. Pipes, conduit, and ventilation duct will be removed as part of the Area decommissioning.
AJ	This Area includes outbuildings not addressed elsewhere. The activities associated with the Area decommissioning include decontamination and demolition of closure project outbuildings, underground storage tanks (UST's), tanks and pads, and appurtenant structure.
AL	The activities associated with the Area decommissioning include PDS and demolition of Building 771 and the connecting tunnels.
AM	This Area includes Building 774. Building 774 includes glovebox 5 with its associated microwave chiller and tank T2F in Room 202, glovebox 355 in Room 103, reagent tanks and pumps in room 241, oil storage tanks 102, 103, and 104, the caustic storage tank outside Building 774 hatch entry, and miscellaneous items in rooms 250 and 212. The plenum in Room 203, and other items located in Rooms 301, 302, 303, 303A, 304, 305, 306, 320, 321, 200, 204, 205, 206, 207, 208, 209, and 220 and the 322 storage shed are also contained within this Area. The activities associated with the Area decommissioning include removal of utilities piping, remaining ventilation systems, interior non-load bearing CMU, and drywall partition, decontamination, PDS, and demolition. Interior surfaces will have paint removed to facilitate PDS.

Table 4. Area Descriptions

Area	Description
AN	This Area includes the indirect/direct evaporative cooling area. The indirect/direct evaporative cooling area includes the 8 new intake air systems, piping, valves, electrical distribution and control panels, and the metal building. The activities associated with the Area decommissioning include the removal of equipment and appurtenant structure associated with the indirect/direct evaporative cooling systems.

4.4 Facility Component Removal, Size Reduction, and Decontamination

This section contains information on the 771 Closure Project approach to component removal, size reduction, and decontamination. In some instances, the sequences of activities and methods are specified. The information contained within these sections is based on the current planning baseline. The actual sequence and methods used may differ from what is indicated in this section, as long as the activity is within the scope of the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*, there will be no modification to the DOP. Throughout this section, statements are made on what type of waste an activity will create. These statements are based on process knowledge and included for information purposes. All waste will be characterized and packaged in accordance with Site Waste Management Programs.

4.4.1 Component Removal and Size Reduction

For the purposes of this DOP, component removal refers to the physical disassembly, size reduction (if necessary), and removal of facility components, including gloveboxes, tanks and ancillary piping, fume hoods, ventilation and filtration systems, other utilities and equipment, walls, ceilings, floors, and structural members. These items must be removed to allow access to building surfaces for decontamination and PDS. Component removal and size reduction will be conducted in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*.

Initially, as work begins in each room, machinery and some equipment will be removed. These are items that are at floor level, generally do not require size reduction, and are not attached to critical safety systems (i.e., zone I ventilation, zone II ventilation and criticality alarms). These items will be isolated from utilities and any other potential energy-producing systems and removed as waste or a recyclable product.

Many items will require size reduction and/or decontamination to place them into waste containers. The central size-reduction area within the building will be used for components that can be moved. Items that are too large to move will be size reduced in place.

Equipment contaminated above the High Contamination Level, as defined in the Site Radiological Manual, will be removed during dismantlement. Consequently, the Sets contain the process equipment such as gloveboxes, tanks, process piping, and other pieces of process-related equipment. Each Dismantlement Set is organized around a room or process to aid in the engineering required to remove the Set. Generally, the following is the sequence for removal of a typical, Dismantlement Set, these steps are typical, and some steps may not be required.

- Execute work package prerequisites,
- Isolate the work area using Lock-out/Tag-out,

- Return gloveboxes to service,
- Remove equipment internal to the glovebox,
- Remove utility and external equipment,
- Decontaminate the glovebox,
- Survey for radiological and non-radiological contamination,
- Apply fixatives,
- Remove the glovebox from ventilation,
- Erect soft-sided containment, if necessary,
- Remove structural support,
- Separate glovebox, if required,
- Transport glovebox to size-reduction area, if necessary, and
- Size reduce glovebox and package as waste

In addition, if there are tanks or other pieces of large process equipment connected to a glovebox system, this equipment will be disconnected and removed before or in conjunction with glovebox removal. The process described above is generally applicable to these items as well.

4.4.2 Decontamination

Decontamination is defined as the removal of contamination from building and equipment surfaces and beneath surfaces by manual, mechanical, chemical, or other means. The purpose of decontamination is to reduce exposure to radiological and chemical hazards, minimize the generation of radioactive and hazardous waste, and to salvage equipment and materials for future use. Decontamination will be conducted in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. The decontamination will be performed in the following general sequence:

At the close of the Dismantlement Set activities, the areas will be empty of gloveboxes, tanks and systems providing services to gloveboxes and tanks. The electrical systems supplying lighting and distribution will remain in place, and the Zone I and II ventilation systems will have been removed. Asbestos removal internal to the structure will be completed, and the areas will be isolated from the balance of the structure to allow decontamination activities.

Room or area walls will be used as containment barriers, or temporary containment barriers will be installed to ensure that decontamination activities are isolated from the balance of the structure. This will ensure that migration of contamination can not occur to the balance of the structure. Mobile HEPA ventilation will be installed for ventilation of areas requiring decontamination. HEPA ventilation exhausted to the environment will be monitored, or exhausted to the building ventilation systems. Dismantlement activities associated with Sets will be accomplished before commencement of dismantlement and decontamination activities associated with the Decommissioning Areas.

Following Dismantlement Set activities, remaining electrical systems will be removed. Temporary electrical services will be installed. Lighting fixtures will be removed, acoustical and metal-pan ceiling fixtures removed and packaged for disposal.

Remaining safety systems will be removed back to the Area boundary, and any necessary modifications performed to replace required safety items.

Remaining utility supply systems will be removed to the Area boundary, and temporary services for support of the decontamination activities installed for supply to the Area.

Interior, non-load bearing block walls and/or gypsum partition walls will be removed and packaged for disposal as low-level waste (LLW)

Before the characterization of the interior concrete surface areas, and physical decontamination activities, painted surfaces in contaminated areas will be abrasively cleaned of paint. It is anticipated that removed material will be packaged for disposal as transuranic waste (TRU) or TRU mixed waste.

Scaffolding will be installed in the area, and upper walls and ceiling areas will be decontaminated first. Concrete ceilings will be decontaminated as necessary, "metal deck" ceilings wiped down, initial surveys completed, and the decontaminated surfaces covered to protect against re-contamination. In metal decking areas, the "pigeon holes" (open areas due to the shape of the decking materials) will be physically covered to prevent re-contamination.

Upper and lower walls will be decontaminated as necessary and preliminary surveys completed. Scaffolding will be removed to allow decontamination and/or removal of the floor surfaces.

Floor areas requiring removal of contaminants exhibiting penetration of less than one inch will be mechanically scabbled to remove contamination. Surface cracks in the floor slabs will be decontaminated with "crack chaser" scabbling equipment.

Floor slabs exhibiting penetration of contaminants greater than one inch will be removed and disposed of as LLW or low-level mixed waste (LLMW). This may include the floor areas within Rooms 114 and 149 and an estimated 25% of the remaining floor areas in Decommissioning Area AE. Surface contamination will be "fixed," and the slabs removed using concrete floor saws and appropriate lifting devices. Piping will be flushed before pipe removal activities are initiated. Piping uncovered during floor removal will be removed during decommissioning. Piping under the slab will be remediated by ER. Floor drains and "below-slab" services not exposed by floor removal will be isolated and identified for removal by ER.

Areas exhibiting residual contamination following the initial pre-demolition surveys will be physically isolated, decontaminated and re-surveyed. Waste will be removed from the Area, pre-certified, and staged outside the Area boundary.

Pre-demolition surveys of interior surface areas will be performed, and permanent isolation barriers for decontaminated Areas will be installed to prevent migration of contaminants into the decontaminated areas.

Systems and equipment attached to the exterior surfaces of the structure will be removed, and initial surveys completed. Areas of the exterior surface requiring decontamination will be decontaminated using local-area containment and ventilation.

Before demolition activities, removal of asbestos-containing materials in the roofs will be accomplished.

Following decontamination of the exterior structure, and removal of remaining asbestos roofing materials, pre-demolition surveys of the building structure will be completed.

4 4 3 Removal of Building Ventilation and Filtration Systems

Building ventilation and filtration systems will be removed in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. Historically, the ventilation zones are defined as Zone I - Glovebox exhaust, Zone II - Room exhaust, Zone III - Building corridor exhaust, and Zone IV - Office and front area exhaust. These definitions are based on the negative pressure differentials that are maintained for certain equipment and areas. The zones have been redefined for planning purposes to Zone 1 - Glovebox exhaust and Zone 2 - will contain all other ventilation.

The HVAC system controls volume, temperature, and humidity of the atmosphere, while maintaining confinement of radioactive materials by means of pressure differential control and exhaust air filtration. Air pressure is increasingly negative from the hallways, to the rooms where radioactive materials are being used, to the gloveboxes. Pressure differentials are maintained through the control of supply and exhaust air. Airborne plutonium would have to pass upstream against several stages of increasing pressure before it could escape to the environment. Automatic electrical interlocks prevent the building from becoming pressurized.

Within Building 771, twelve systems supply the airflow requirements of 210,000 to 250,000 cubic feet per minute under normal operating conditions. Outside air is taken in on the second floor through bird screens and pneumatically operated inlet dampers, and filtered and washed. Standard air washing equipment scrubs and cools the air. Airflow is controlled by a set of dampers at each supply fan, and backflow dampers are provided. Air flows through ductwork to the respective areas.

As facility components are removed and/or decontaminated, workers will complete the removal of remaining utilities, including building ventilation and filtration systems. Due to the potential for radiological and/or chemical contamination within system ductwork, there is a possibility for releases of hazardous and/or radioactive materials to the environment. Therefore, the removal sequence is extremely important and will be planned carefully for each building/Area. Although the approach may differ on a building-by-building or Area-by-Area basis, the general removal sequence described below will be utilized.

- Airflow studies will be performed in accordance with the Radiological Safety Practices Manual to determine feasibility of the removal action and identify potential problems and options.
- Zone I plenums will be maintained until the gloveboxes and ductwork have been stripped out.
- Glovebox removal will be initiated at the glovebox farthest away from the plenum, and work will continue toward the plenum to ensure the air continues to flow from areas of least contamination to areas of higher contamination. There may be exceptions to this rule depending on access restrictions.
- Air studies will continue throughout the glovebox removal to ensure the zones are balanced and negative pressure is maintained in accordance with the authorization basis. Airflow will be balanced using the Zone II system and/or temporary ventilation and filtration systems.
- Once the Zone I gloveboxes and ductwork have been removed, the areas serviced by that ventilation can be decontaminated to the unrestricted release criteria.
- Plenums and associated ductwork will be removed.
- Airflow will be balanced, if necessary, using temporary ventilation and filtration systems.

4 4 4 Room 141

Room 141, sometimes referred to as an infinity room, was originally constructed to function as an SNM storage vault, and subsequently re-configured to function as a pump room. Operational problems with the pumping operation resulted in radionuclide bearing acidic solution spills contaminating the floor and the pump pedestals. The resulting contamination was so high that the operation was eventually phased out.

Subsequent remediation actions to remove contaminated concrete resulted in high airborne concentrations, and the room was eventually sealed and abandoned. Lead shielding was present during the pump operation periods. The acid spills may have deposited some lead contamination in the concrete structures. Room 141 will be removed instead of decontaminated, removal will be conducted in accordance with the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. In general, Room 141 removal will be performed in the following sequence:

- Specialized lifting equipment will be installed at the second floor roof level, and certified for capacity, to accommodate the removal of appropriate sections of floor, ceiling, and wall materials.
- Decontamination activities on the second floor area above Room 141 will need to be completed before the start of Room 141 removal. Second-floor walls and floors (including any supporting metal floor deck) between Columns 12 and 14 S, and Columns M and S will be removed back to within five feet of the supporting beams and girders around the footprint of Room 141. The west walls of the stairwell, Rooms 144 and 244, and the elevator shaft will remain. This will require the removal of approximately 1,100 square feet of second floor area and the supporting metal deck. Removed floor sections will be surveyed and released. Appropriate safety systems will be installed to prevent falls.
- The six-inch downspout for the stormsewer drain system located on the exterior of the south wall of Room 114 will be re-routed from the roof drains, the riser sections removed, and the system capped.
- To maintain the integrity of the Building 771 structure for segmentation activities, additional shoring materials will be added to the north side of Columns P13 and P14, which constitute an integral portion of the north wall of Room 141. Columns P13 and P14 will be left in place, and concrete wall sections will be removed up to, but not including, these columns.
- A three-stage, HEPA ventilated containment structure will be erected from the first-floor elevation to the interior of the building roof. The containment will be erected to surround the exterior of Room 141, using the existing stairwell and elevator shaft walls. The containment will maintain negative air pressure to the balance of the building. Scaffolding will be installed around the exterior north, south and east walls of Room 141 to allow access to the walls and ceiling concrete of the room.
- An adapter to insert a passive aerosol fog will be installed in the door of the room from the hall, and the interior of Room 141 will be "fogged" to encapsulate the contaminants on the interior surfaces of the room and reduce the possibility for airborne contamination. A portable HEPA ventilator will be installed to maintain the room air pressure negative to the outer containment. The final task before entry will be the spraying of a final fixative covering on concrete surfaces within the room. The ability to "re-fog" the room will be maintained during the removal operation. The room will be entered, and any loose items will be removed and packaged for disposal as TRU material. Pipes and conduit connected to walls in the room will be severed or removed. Any systems traversing the room will be isolated and prepared for removal.
- The ceiling concrete will be reinforced with an additional structural member to prevent movement and provide support of the concrete as it is removed. Concrete anchors for installation of lifting eyes will be installed in each section before segmenting operations.
- Concrete wall saws will be used to cut the ceiling and wall structure into blocks. Cutting operations will penetrate the surfaces only deep enough to sever the reinforcing bars of the concrete. This will reduce the possibility of cooling water from the saw being introduced to the interior contaminated surfaces. Ceiling concrete will be segmented into blocks of approximately 3 feet by 3 feet. Following segmentation of the ceiling structure, concrete blocks will be "cracked," removed in sequence, and packaged for disposal. Temporary HEPA ventilation will be placed in the areas being "cracked" to prevent any airborne contamination.

arising from the cracking and removal process. Ceiling concrete will be packaged as LLW. A temporary ceiling cover will be installed to replace removed ceiling concrete and maintain containment integrity for the room.

- The north, south and west walls of Room 141 will be segmented with concrete wall saws, and removed in sequence from top to bottom. Concrete anchors will be installed in the top surfaces of blocks to facilitate lifting. Cutting operations will penetrate the surfaces only deep enough to sever the reinforcing bars of the concrete. This will reduce the possibility of cooling water from the saw being introduced to the interior contaminated surfaces. The walls will be segmented into blocks approximately 3 feet by 3 feet. Walls will be removed with the exception of Columns P13 and P14, which are structurally integral to the north wall of Room 141. These columns will be wrapped with plastic covering as concrete removal proceeds from top to bottom to prevent migration of contamination from the interior surface. Following segmentation, concrete blocks will be "cracked", removed in sequence, and packaged for disposal. Temporary HEPA ventilation will be placed in the areas being "cracked" to prevent airborne contamination. Removed concrete from the upper walls will be packaged for disposal as LLW. Removed concrete from the lower walls will be packaged for disposal as TRU material.
- Scaffolding installed for the removal of the walls and ceiling concrete, and a temporary flooring of plywood will be installed to prevent migration of contamination from the floor to other surfaces.
- Scaffolding will be installed around Columns P13 and P14 to facilitate decontamination activities. Concrete surfaces interior to Room 141 will be scarified using chipping hammers, and if warranted by structural considerations, additional shoring will be installed at these columns.
- The east wall of Room 141, comprising the structure of the elevator shaft, will remain. Temporary removal of service of the elevator will be required. Lower sections of the elevator will be removed as necessary, following the placement of reinforcement for the wall, and an appropriate containment structure.
- Floor slabs will be segmented using a floor saw. Concrete anchors will be installed for lifting eyes, and the slabs will be removed and packaged for disposal as TRU material. Process drain piping below the slab will be stabilized, segmented and removed. Remaining process drain piping not removed will be capped and abandoned in place for management by ER.

4.5 Environmental Restoration

This section meets the requirements for a PAM developed for accelerated actions under the RFCA (DOE, 1996). The ARARs associated with these activities are detailed in Section 7, the environmental consequences are detailed in Section 8, and the waste types are detailed in Section 5.1. The source removal action will be performed in association with the 771 Closure Project decommissioning and will address the UBC associated with Buildings 770, 771, 771C and 774, and the process waste lines beneath these buildings. Remediation of Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), and/or soils associated with these buildings but not part of the UBC will be addressed by the ER RSOP or another ER decision document, and is not part of the scope of this remedial action. Groundwater contamination in the area will be addressed as part of the Industrial Area Plume, and not as part of this remedial action.

The extent of the UBC will be determined during implementation of the Industrial Area Sampling and Analysis Plan (IASAP) (in preparation). The RCRA closure of the Site's process waste lines is not a part of this action. This will take place when IHSS 121 - Original Process Waste Lines is dispositioned. Following completion of UBC remediation for the three buildings, foundation drains will be addressed.

during remediation of the IHSSs associated with the 771 Closure Project. The drains will be interrupted and backfilled or otherwise blocked to prevent a potential conduit to the drainage.

The excavation of contaminated soils from under Buildings 770, 771 and 774 is dependent on the completion of preliminary UBC characterization and the decommissioning of these buildings. Work is scheduled to commence immediately following removal of the slab overlying identified areas of contamination. Data compilation and reporting are scheduled to be completed by the end of the summer of 2001. Any delays, scope or budget changes affect these dates, but this schedule is not enforceable and changes do not require modifications to this DOP.

4.5.1 Project Description

The buildings' history and description are detailed in Section 3.0, and the data are summarized here only as it applies to the proposed remedial action. Building 771 was placed into service in 1953 and was the original plutonium component production facility. After 1957, the building was used for chemical recovery of plutonium and americium from manufacturing residues and scrap metal (DOE, 1992). The building footprint is approximately 151,000 square feet. Building 774 was placed into service in 1953 and was used for the treatment of highly radioactive aqueous wastes, low-level radioactive aqueous wastes, waste oils, and non-radioactive waste photographic solutions (DOE, 1992). The building footprint is approximately 25,000 square feet. Building 770 was placed into service in 1953 for radioactive operations waste storage. The building footprint is approximately 2,900 square feet.

The remedial action is to perform a source removal of soils under the buildings that are contaminated above Tier 1 soil action levels. The extent of the remedial action will be determined based on characterization activities that will be defined in the IASAP. The source removal will remediate soils to the extent practicable. The removal actions may be limited for worker health and safety and/or building stability reasons. Following the source removal action, the soils will be appropriately dispositioned offsite. Groundwater contamination will not be addressed as part of this remedial action.

4.5.2 Hydrogeological Setting

Buildings 771 and 774 were constructed after excavation into the low permeability claystone bedrock in the area. Building 770 is constructed on a slab. The claystone under Buildings 771 and 774 limits the vertical migration of contaminants that may have been released into the environment, including potential volatile organic compound (VOC) contamination. The top of bedrock surface before construction of Building 771 sloped to the northeast and was approximately 10 to 15 feet below ground surface. Excavation during construction of these buildings altered this surface, and now the bedrock surface is at depths of 20 feet or more. Construction may have also created a localized depression in the bedrock next to the buildings.

4.5.3 Data Summary

No UBC characterization data are available at this time. However, there have been known or suspected releases, spills and leaks that potentially have resulted in radioactive, organic contamination of the soil underlying Buildings 771 and 774. One known spill potentially has caused radionuclide contamination in the soil underlying Building 770.

For Buildings 771 and 774, it is anticipated that UBC will be limited to the immediate underlying backfill material. This is because the building foundations are below the water table resulting in a hydraulic gradient upward into the building and associated footing drains. The flow of groundwater into the building and/or footing drains, instead of away from the building, limits contaminant migration. In addition, the bedrock beneath the buildings is most likely weathered claystone of the Arapahoe or Laramie Formations (EG&G, 1995a). This material has a mean hydraulic conductivity of 8.82×10^{-7} .

centimeters per second, which indicates that neither groundwater nor contamination are readily transported in this area (EG&G, 1995b)

Using process knowledge, the potential contaminants of concern (PCOCs) for UBC at Buildings 771 and 774 are expected to be the VOCs historically used on Site and their degradation products, as well as plutonium and americium. Table 5 lists the PCOCs along with the RFCA action levels. The PCOC list includes contaminants from potential leaks from the original process waste line and spills inside the buildings. If characterization activities determine that PCOCs are present in the UBC above RFCA action levels, excavation is planned. If characterization of the UBC determines that soils are less than the action levels provided below, then no action is planned.

Table 5 Potential Contaminants of Concern And Clean-up Target Levels

Contaminant	RFCA Tier 1 Soil Action Levels	RFCA Tier 2 Soil Action Levels
Carbon Tetrachloride	3.56 mg/kg	0.0356 mg/kg
Tetrachloroethene	3.15 mg/kg	0.0315 mg/kg
Trichloroethene	3.28 mg/kg	0.0328 mg/kg
Plutonium 239/240	562 pCi/g*	115 pCi/g*
Americium 241	101 pCi/g*	21 pCi/g*

*Sum of ratio method assuming presence of both isotopes in pCi/g

One spill has been documented in Building 770 that resulted in contamination up to 200,000 dpm/100 square centimeters in and around the building (DOE, 1992). Based on this information, the PCOCs for Building 770 are plutonium and americium only. Because of the small volume of the spill, the UBC will probably be limited to soils immediately beneath the building.

Characterization of the three buildings will be performed in two phases in accordance with the IASAP. First, core samples will be taken through the concrete floor slabs to determine the presence or absence of contaminants and the approximate extent of the UBC. This will take place early during the building decommissioning process when access to the suspected UBC areas is possible. The first phase of sampling will include areas where known spills, releases or leaks occurred, and along the process waste lines. These data will be used for project planning purposes. Second, sampling will take place during remediation, which will determine the full extent of contamination and guide the remedial action including confirmation that remedial objectives have been achieved.

4.5.4 Project Approach

For Building 770, remediation of the UBC will start immediately after the concrete slab is removed. For Buildings 771 and 774, after the building strip-out is completed, the proposed accelerated action will entail excavating through the concrete slabs while the building structures are still in place. The remaining building structures will allow access to the UBC while minimizing the need for shoring and providing protection from weather conditions. The concrete slabs overlying contaminated soils will be removed during decommissioning along with contaminated building structures and appropriately dispositioned at that time. Following this, as part of the remedial action, the contaminated soil and process waste lines associated with the UBC will be excavated and dispositioned, as appropriate. During remediation, process waste lines not associated with UBC will be grouted or foamed in place to eliminate potential pathways for migration of residual contamination.

The project will be conducted in accordance with the RFCA guidelines, and with DOE and Site ER policies and procedures. The project will also use lessons learned from previous accelerated actions.

4 5 4 1 Proposed Action Objectives

Some of the subsurface soils under the buildings are anticipated to contain concentrations of VOCs and radionuclides above Tier 1 action levels. The objective of the accelerated action is to remove VOC- and radionuclide-contaminated soils above RFCA Tier 1 action levels from the areas beneath the buildings.

4 5 4 2 Proposed Action

This action will involve excavating approximately 10,000 cubic yards of soil and associated debris, including process waste lines, from under Buildings 771 and 774, and 30 cubic yards of soil from under Building 770. These estimates are based on process knowledge and documentation of historical releases. Soil removal will be performed using standard excavating equipment at the appropriate scale for working inside buildings. The contaminated soil above Tier 1 action levels will be placed into appropriate waste containers for off-site disposal. Soil below Tier 1 action levels will be temporarily stockpiled and returned to the excavation after soil removal is completed.

4 5 4 3 Excavation

Conventional excavation techniques will be used to remove the contaminated soil and associated process waste lines. For Building 771 and 774, equipment will be chosen that can readily perform work inside the buildings. Where possible, smaller sized equipment will be chosen that does not have to be disassembled to access the building areas. If larger equipment is required, then it will be disassembled and moved to the UBC areas. Excavation equipment will consist of excavators, backhoes, and/or front-end loaders. Contaminated soils will be placed directly into the appropriate waste containers, where possible. However, temporary staging areas for the excavated soil and debris may be used, if necessary.

During remediation of Building 770 UBC, dust minimization techniques, such as water sprays, will be used to minimize suspension of particulate. In addition, earth-moving operations will not be conducted during periods of high winds. The RFETS Field Operations Procedure FO 01, Air Monitoring and Dust Control, will be incorporated into the project planning. Dust control will effectively limit the spread of contamination during the remedial action.

For remediation of Buildings 771 and 774 UBC, excavation will take place within the intact building shell. The underlying soils are expected to be moist and therefore, dust minimization requirements will be minimal. However, dust suppression will be utilized as required, and to prevent the spread of contamination.

Field instruments as described in the IASAP (in preparation) will be used to guide excavation activities. At the completion of excavation, samples and/or surveys will be taken along the base and sides of the excavation, to verify the completion of the remedial action. If cleanup targets are not verified, further excavation and sampling will continue until either the cleanup target levels listed in Table 5, or until building integrity and/or worker safety issues limit continued excavation. Cleanup target levels used for the excavation activities are the RFCA Tier 1 soil action levels.

The least complex scenario for the extent of anticipated contaminated media is that the impacted soil is limited to the backfill space between the bottom of the concrete slab and the top of building foundation footings. Under this scenario, no structural foundation elements will be disturbed. It is anticipated that contaminants will not have migrated significantly in either a horizontal or vertical direction, because these compounds are insoluble in nature. In addition, there was an absence of hydraulic head, which would drive a spill condition through cracks in the floor and deep into the underlying backfill layer. Therefore, it is assumed that these contaminants will likely be limited to the layer of soil directly beneath the slab.

Should the contamination have migrated vertically beneath the strip footing of exterior walls or interior pilaster pads, options do exist to safely complete the soil removal, or to stabilize a remaining inaccessible

contamination until the demolition is complete and a limited final excavation can be performed. If impacted soils are identified beneath an interior pilaster pad, soil will be removed at an angle of 45 degrees from the base of the pad until such time as the removal adjacent to the pad is complete. New concrete pads will be placed upon the clean soil adjacent to the impacted pad. A "saddle" will be attached to the pilaster, transferring the any loading to the new pads. At this point, the affected pad will be disconnected from the pilaster, and the impacted soil beneath the pilaster will be removed.

Should contamination have migrated beneath a spread footing, it will be assessed, and dispositioned depending upon the length of footing. Impacted soil will be removed at an angle of 45 degrees from the toe of the footing until the removal adjacent to the footing is complete. Short lengths of footing (3-4 feet) can be exposed by removing impacted soil from beneath the footing without risking the structural integrity of the building. Limited underpinning will be used, if contamination extends into the soil. Finally, the impacted area will be demarcated, a liner placed to cover the concrete footing and isolate the impacted soil, and a 6-inch cap of low-slump concrete placed over the soil. This concrete cap will isolate the contamination and prevent cross-contamination during demolition. The soil will be removed after demolition is complete.

Debris encountered during the excavation will be size reduced as necessary, then appropriately dispositioned along with the soil removed with the debris.

Because Buildings 771 and 774 are constructed below the water table, dewatering of the excavation may be necessary to maintain a safe working environment. If dewatering of the excavation is necessary, a temporary sump will be installed within the excavation and used to transfer the water into a temporary storage container(s). The water will then be sampled and managed as per the Site's Incidental Water Program.

4.5.4.4 Staging of Excavated Soil

Excavated soils and debris will be immediately placed in waste containers where possible, particularly for Building 770. However, soil or debris excavated from under Buildings 771 and 774 will be staged inside the buildings and adjacent to the excavations if it cannot be immediately dispositioned. Sufficient space will be allowed between the excavation and the staging areas for equipment to maneuver, and to prevent collapse of staged materials into the excavation.

Soil with contamination levels below Tier 1 action levels will be placed directly on the concrete slab or existing flooring materials. Soil above Tier 1 action levels will be placed on impermeable material to limit the spread of contamination. If the soils are wet, the area(s) will be bermed to contain water that may seep from the soils. This water will be collected and added to the water collected from the excavation for appropriate dispositioning.

At the completion of remediation efforts, soil below Tier 2 action levels will be returned to the excavation. Soils with contamination above Tier 2 levels but below Tier 1 levels will be appropriately managed and evaluated for return to the excavation. ER, in conjunction with the Integrated Monitoring Program, will evaluate impacts to surface water to make this determination. Soil returned to the excavation will comply with the subsidence requirements of the RSOP for Recycling Concrete. No other backfill material will be utilized unless concrete that meets the unrestricted release criteria is returned to the excavated area during building demolition.

4.5.4.5 Completion of Remedial Action

Following verification that the remedial action is complete, Decommissioning will continue building demolition. Each building will be separately released for continued demolition as its UBC is remediated. After the environmental remediation actions are completed, the equipment used will be decontaminated,

generally by pressure washing, and released Materials incapable of being decontaminated will be disposed according to Site standard low-level waste disposal procedures

4 5 5 Worker Health and Safety

Because of the anticipated contaminants, this project falls under the scope of the Occupational Safety and Health Administration (OSHA) construction standard for Hazardous Waste Operations and Emergency Response, 29 Code of Federal Regulations (CFR) 1926.65. Under this standard, a Site-Specific Health and Safety Plan will be developed to address the safety and health hazards of each phase of site operations and specify the requirements and procedures for employee protection. In addition, the DOE Order for Construction Project Safety and Health Management, 5480.9A, applies to this project. This order requires the preparation of activity hazard analyses (AHAs) to identify each task, the hazards associated with each task, and the cautions necessary to mitigate the hazards. These requirements will be integrated wherever appropriate.

This project could expose workers to physical, chemical, and low levels of radiological hazards. The physical hazards include those associated with excavation activities, use of heavy equipment, noise, heat stress, cold stress, and work on uneven surfaces. Physical hazards will be mitigated by appropriate use of personal protective equipment (PPE), engineering, and administrative controls. Chemical hazards will be mitigated by the use of PPE, engineering, and administrative controls. Appropriate skin and respiratory personal protective equipment will be worn throughout the project. Routine VOC monitoring will be conducted with an organic vapor monitor for any employees who must work near the contaminated soil (i.e., soil sampling or excavation personnel).

If field conditions vary from the planned approach, an AHA will be prepared for the existing circumstances and work will proceed according to the appropriate control measures. Data and controls will be continually evaluated. Field radiological screening will be conducted using radiological instruments appropriate to detect surface contamination and airborne radioactivity. As required by 10 CFR 835, Radiation Protection of Occupational Workers, applicable implementing procedures will be followed to ensure protection of the workers. Finally, dust minimization techniques will be used to minimize suspension of contaminated soils.

4 5 6 Waste Management

The soils below Tier 1 action levels will be returned to the excavation. Soils above Tier 1 action levels will be managed and dispositioned offsite appropriately. Any ancillary wastes generated as part of this proposed action, such as PPE, will be characterized based on process knowledge and radiological screening. Waste will be managed, recycled, treated and/or disposed of in accordance with Site policies and procedures, and in accordance with Federal, State and local laws and regulations. Waste that cannot be directly shipped offsite from the project will be appropriately managed by the Materials Stewardship Project until it can be dispositioned offsite.

Waste volumes were estimated based on preliminary information and process knowledge. The waste derived from Building 770 remedial action is expected to be 30 cubic yards total, with 12 cubic yards of low-level waste, 12 cubic yards of non-radioactive waste, and 6 cubic yards of low-level mixed waste. For Buildings 771 and 774 combined, the total waste volume is anticipated to be 10,000 cubic yards with 8,000 cubic yards assumed to be low level waste and 2,000 cubic yards assumed to be low-level mixed waste. These waste volumes will be refined based on the characterization results.

4.6 Pre-Demolition Survey

Before facility demolition, a pre-demolition survey (PDS) will be conducted to verify the nature and extent of radiological and chemical contamination in the facility. The survey will be conducted in accordance with DDCP. In general, the characterization process will incorporate the following steps:

- The 771 Closure Project team will develop characterization packages for taking final measurements and samples
- DOE and the LRA will review the sampling results
- DOE and/or the LRA will conduct an independent verification of the characterization data, if required
- The LRA, at its discretion, may review the results from an independent verification
- During the characterization process, the LRA will have access to the facilities to collect samples or measurements, at its discretion

The PDS is intended to verify that the condition of the survey unit meets the requirements for demolition and disposal as provided in this DOP modification. The PDS is conducted in accordance with the requirements of the PDSP¹⁷. The type of data necessary to satisfy the objectives of PDS include total surface contamination measurements, removable surface contamination measurements, and scan data. Surface media sampling will only be required on a limited basis, given that suspect surface media will be removed during decommissioning.

Additional information required to design the PDS include in-process survey data and updated maps to reflect structural alterations. In-process surveys are performed to assess the changing radiological conditions during the course of decommissioning and to confirm that an area is free of gross contamination. In-process survey data will be incorporated into the PDS report.

PDS will not be repeated for Type 1 structures, if isolation controls were maintained throughout the duration of the project. Verification surveys will be performed before the release of these structures to confirm that radioactive material was not introduced into these areas. Structures such as administrative support trailers, guard stations and trailers, and auxiliary support trailers and outbuildings (acid storage, maintenance, etc.), as well as the Building 771 indirect/direct evaporative cooling are included in this category.

Non-radiological contaminants will be addressed at the RLC and in-process phases of decommissioning. In general, non-radiological contaminants will have been removed before the PDS begins, very little, if any, additional sampling will be needed. The non-radiological sampling methodology will be documented in the Pre-Demolition Survey Report. In limited cases (e.g., Building 771/Building 774 roof), non-radiological characterization may be required during the PDS phase.

Based upon available data/information, the following sampling plan is recommended in order to support the PDS effort for both radiological and non-radiological constituents:

- The building surfaces will be divided into survey units based on the requirements outlined in the PDSP. The types of measurements that will be performed during PDS include total surface contamination, removable surface contamination, and surface scans
- Surface media samples may also be required on a limited basis. For this estimate, the 771 Closure Project will be delineated by the (13) decommissioning areas

An independent verification (IV) survey may be performed on an established percentage of survey units (typically five percent) following the completion of the PDS. The independent verification

¹⁷ The RFETS Pre-Demolition Survey Plan is in draft form and under-going review and approval by the regulators

contractor (IVC) will be selected and funded by the DOE and/or LRA such that independence is maintained from the 771 Closure Project personnel

4.7 Facility Demolition

This section contains extensive information on the 771 Closure Project approach to demolition. In some instances, the sequence of activities and methods has been specified. The information contained within these sections is based on the current planning basis. The actual sequence and methods used may differ from what is indicated in this section, as long as the activity is within the scope of the *RSOP for Facility Disposition*, there will be no modification to the DOP.

The demolition phase of decommissioning includes removal of the building shell, slab, foundation and facility footing to a depth at least three feet below the final proposed grade. The demolition will be conducted in accordance with the *RSOP for Facility Disposition*.

4.7.1 Demolition Planning and Execution

In general, the demolition scope will focus on remaining structures, facilities and appurtenances associated with the 771 Closure Project, as globally defined by Dismantlement Sets and Decommissioning Areas. The scope includes such associated appurtenances as retaining walls, loading docks, pads, temporary structures, and underground utilities or structural features to the edge of the foundations. Sidewalks, fences, and aboveground exterior utilities will be removed on a case-by-base basis and coordinated with the Remediation, Industrial Decommissioning, and Site Services (RISS) Project. Asphalt roadways and the remaining underground utilities will be addressed under a separate ER decision document.

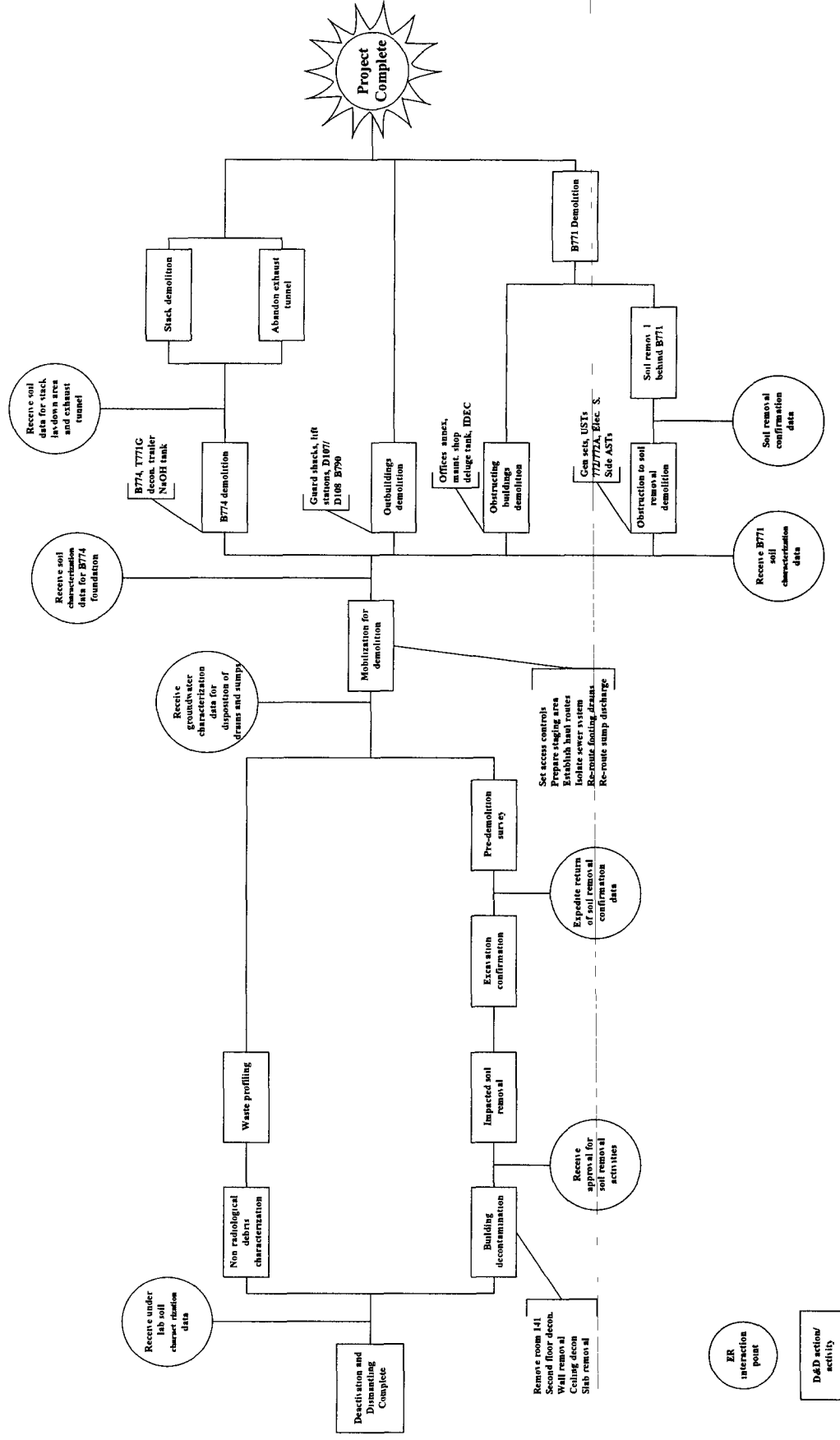
4.7.1.1 Overview

Demolition will be accomplished using a variety of mechanized equipment, primarily of the tracked variety due to the high incidence of tire failures that accompanies the use of rubber-tired equipment. Tracked excavators fitted with quick-change attachments are the preferred piece of equipment, using a variety of hydraulic shears, grapples, thumbs and vibratory demolition hammers to accomplish various demolition needs. A large tracked excavator properly outfitted can be used effectively on most two to three story tall demolition applications. Additionally, the detachable tools can be fitted with remote operated fogging water-spray nozzles for dust control purposes in order to prevent personnel with dust control spray hoses from getting into tight locations with limited escape routes. During demolition, airborne dust will be monitored on a visual presence or absence criterion, with dust control water spray being applied as required from a fire hose equipped with a fog nozzle.

Excavators can easily direct load debris into disposal containers or trucks, or front-end loaders can also be brought in depending on the debris haul distance. Figure 4 provides an overview of the sequence of demolition activities with the ER interface points. The following bullets provide the general sequence of activities associated with the demolition of the 771 Closure Project.

- Mobilization,
- Site preparation,
- Removal of overhead obstructions,
- Removal of site features required to execute demolition (paved lots and streets for ease of access, retaining walls, fences, exterior fire system components),
- Demolition of outbuildings and site features closest to the Building 771 and 774 footprints,
- Demolition of remaining outbuildings and site features,

Figure 4. Demolition Activities and ER Interface



- Demolition of structures and appurtenances specific to Building 771 and 774 but independent of the main production floor space of Building 771 (e.g. Building 771 office spaces and maintenance shop) and soil removal around Building 771,
- Demolition of the main Building 774 building structure,
- Demolition of the main Building 771 building structure after using Building 771 as the containment for UBC remediation,
- Site cleanup, and
- Demobilization

The demolition sequence is based on technical requirements. However, starting the demolition process on the smaller outbuildings will ensure that the process is refined before the more complicated structures are initiated.

4.7.1.2 Mobilization

The demolition execution will begin with the mobilization of the demolition contractor followed by site preparation. A central contractor's area will be established in an existing improved area, such as the paved area along the north side of Building 771 and Building 774. The decommissioning contractor may mobilize the following items: office trailers, shower/change facilities, lunchroom, portable toilets, hand wash units, and tool/equipment storage. A security fence will be established for access control purposes only.

4.7.1.3 Site Preparation

As part of site preparation, existing features associated with site utility systems will be located and marked. These systems will be evaluated for isolation purposes. The sanitary sewer system will need to be isolated to prevent inflow of inappropriate wastewater generated by demolition dust control activities. Electrical and communication needs within the 771 Closure Project area will be dynamic, but it is likely that power fed from the main distribution point at the south side of the Building 771 will be terminated to allow for the removal of site features in the area.

Critical power requirements will be identified as a part of the design process. Maintaining sump and foundation pumps for control of groundwater, power to sanitary sewer lift stations, and some area lighting will be necessary.

Protective barriers or fences will be erected around permanent site features designated to remain after completion of demolition and site restoration. Electrical distribution switchgear, overhead distribution lines, and area lighting to remain operational during and/or after the demolition will be protected as required and flagged for added operator awareness and overall visibility.

Run-on and run-off control features will be erected or implemented. Installation of temporary diversion berms, erosion control silt fencing, and interceptor ditches, as well as the clean out of existing drainage culverts and ditches will be accomplished as required to divert significant overland flow away from the demolition area.

Traffic patterns and specific-loading areas for waste management will be established, as will temporary stockpile areas for debris. For any backfill material that appears likely to be in temporary storage for a long period, a more permanent area will be created that will encompass additional erosion or run-on/run-off controls as necessary. The location of any long-term backfill stockpile area will be coordinated with ER. Finally, any known contaminated surficial soils in the areas immediately adjacent to planned demolition activities will be delineated and controlled by ER.

4 7 1 4 Removal of Site Features

Initial demolition tasks will involve stripping remnant equipment, stacks, and other materials from rooftops. The removal of overhead obstructions will reduce the possibility of equipment encountering energized electrical lines, and will allow access for operating cranes and long reach tracked excavators. The removal of remnant equipment is required early in the process in order to free up the roof system for dismantling/removal of suspected asbestos containing material in the roof membrane.

4 7 1 5 Demolition of Outbuildings

The majority of the outbuildings in the 771 Closure Project are small, light, steel-framed structures with corrugated metal siding, and were placed on cast-in-place concrete slabs. These structures will be shredded and sized on their respective concrete slabs with the tracked excavator using a detachable hydraulic shear. Metal materials will be shipped off site for recycling, with any non-recyclable items being direct loaded into containers for off site disposal. Dependant upon identification or investigation of environmental media concerns, the concrete slab/foundation associated with the building will be broken up using a vibratory hammer attachment to the excavator, with the rubble being designated as suitable for onsite backfill. The remaining outbuildings are temporary trailers, and will be dispositioned as property.

Demolition activities will be initiated with the features closest to the Buildings 771 and 774 footprints to free up these areas for support and preparatory activities. For example, the remnant building shell and foundation associated with Building 715 and Building 716 will need to be removed to clear the area for the removal of soil from the buried south wall of Building 771. Removal of remnant underground storage tanks (USTs) in this area is necessary for the same reason. It is assumed that five USTs remain in the area to the south of Building 771. Two former diesel/fuel oil USTs appear to have been abandoned in place using foaming techniques. Three other USTs are suspected beneath the concrete slab of Building 716. These tanks will be removed before removing the soil from behind the south wall of Building 771.

4 7 1 6 Demolition of Structures and Appurtenances Specific to Building 771 and Building 774

The next area to address in the demolition process will be those structures and appurtenances specific to Building 771 and Building 774, but independent of the main production floor space of Building 771. The objective is to remove structures, which do not allow unrestricted access to the main building structure. These structures include, but are not limited to Building 771A and B office spaces, T771C, Building 771C annex, West Dock, Maintenance Shop and Deluge Tank Annex, and Building 774 East Dock, hatch cover, Rooms 206-208, 212, and 250-251. Removal of these features allows access to the elevated portions of the respective buildings, as well as provides loading platforms for loading waste containers and debris hauling trucks. For Building 771, this action exposes the main structure, as defined by the three buried cast-in-place concrete walls on the south, east and west sides, and the cast-in-place concrete firewall between the office spaces on the north side of the main Building 771 footprint and the main operations area.

At the same time, the demolition contractor will be moving soil away from the east, west, and south walls of Building 771 down to an elevation approximately coincident with the second floor framing/slab. Removal of this soil will relieve passive earth loading pressure from the top one-half of the wall, and will allow for the removal of the roof framing system. The concrete walls making up the main structure of the building were not designed or constructed as retaining walls, demolition will leave as much of these concrete walls in place, as possible. The objective of the soil removal and demolition is to leave the area in a safe configuration until the site is backfilled during site restoration. The maximum amount of wall to be left in place would correspond to a line 3 feet below the anticipated final grade of the hillside. Demolition of the eight-foot retaining wall south of the 771C Annex will be accomplished at this time to facilitate soil removal from the Building 771 east wall.

As soil is removed from the south, east and west sides of Building 771, it will be transported to a temporary stockpile area adjacent to the demolition project (assumed within one-mile round trip for estimating purposes). The anticipated configuration of the excavation behind the buried walls is a 15-foot horizontal working surface immediately behind the wall with the excavation sloping up to the nearest undisturbed grade at a slope of 1.5 feet horizontal to 1 foot vertical. Engineering calculations will be made to validate the above described scenario of exposed unsupported wall lengths based on the remaining passive soil loading, active loading from machinery operating in the vicinity of the wall, revised wind loading, and interior structural framing to remain abandoned-in-place.

4.7.1.7 Removal of the Main Building 774 Structure

The demolition approach for the Building 774 footprint will follow the same overall approach of working off of the existing first-floor slab elevation and collapsing demolition materials and debris into, and onto, this surface for segregation, sizing, and direct loading into containers and trucks positioned along the existing north side paved loading area. In addition, the Room 322 Storage Shed and Building 774, Door No. 12 concrete areas will be used to take advantage of working off of the stable grade adjacent to the exterior of these walls.

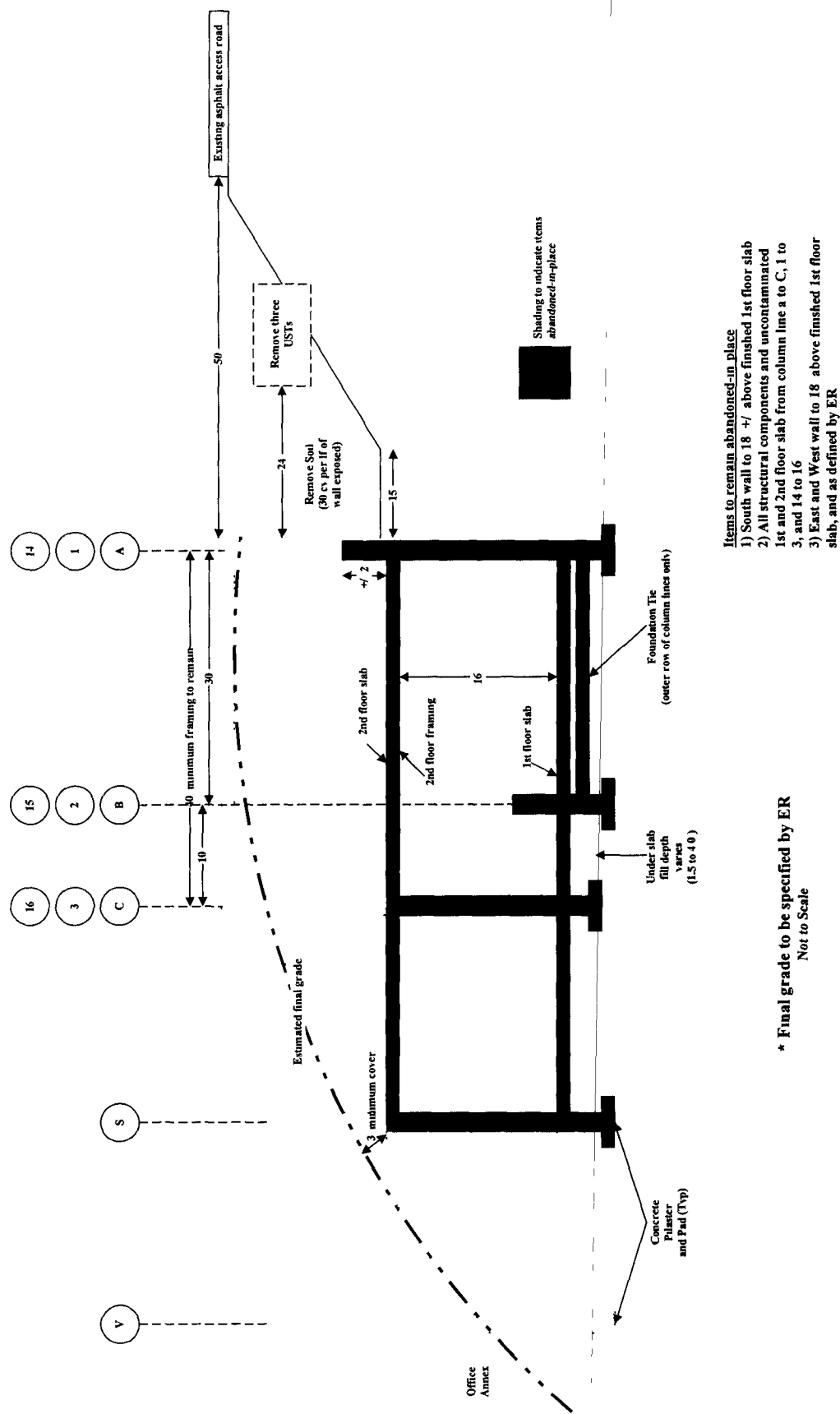
4.7.1.8 Demolition of the main Building 771 Structure

The demolition of Building 771 will be initiated with the removal of the slab, as required for ER access. After the UBC has been remediated, the remaining demolition will be completed. Once the office and loading areas have been removed to the elevation of the existing finished floor, and engineered soil removals have been accomplished to relieve passive soil loading conditions, an opening will be advanced into the main Building 771 structure from the north wall, moving south onto the finished floor slab of the first floor. The building structure will be demolished using tracked excavators, working off the first floor slab, equipped with detachable hydraulic shears and using the remnant slab of the office area as a staging area and loading areas. The concrete wall will be removed to a point a minimum of 3 feet below the proposed grade. This will be accomplished using the tracked excavator, working along the indicated projection of the final cap grade (minus 3 feet) using the demolition hammer to "score" the line, followed by a combination of shears and hammer to remove the loosened concrete wall above the line. This action would likely be accomplished from the exterior of the foundation wall with the concrete failed either into or out of building to be further sized and segregated from reinforcing steel as appropriate for disposition as on site clean fill.

As materials are generated from the demolition process, they will be evaluated and segregated on the basis of ultimate disposal pathway, sized according to predetermined disposition acceptance criteria, and placed into containers or transport trucks for shipping to the appropriate disposition location or destination. Empty disposal containers and haulage trucks will be staged along the north side of this loading dock, with demolition debris loaded directly for transport. Piles of segregated materials may remain staged on the dock until an appropriate amount has been generated and an appropriate container can be delivered.

The interim goal of the demolition effort will be to leave a three-sided "handball court" configuration for the Building 771 foundation area. Leaving the first two bays of structural concrete framing between the first and second floors, as well as the associated second floor slab, will provide support for the three walls of the "handball court", leaving the area safe for worker access. This will likely be the final configuration of the foundation for Building 771, before ER commencing final site restoration. Figure 5 provides a simplified view of what will and will not be removed during demolition.

Figure 5. Building 771 Demolition Concept



4 7 1 9 Site Cleanup and Demobilization

The final task to be completed by the decommissioning contractor is to perform any backfill and compaction necessary to render the site safe for personnel involved in follow-on site closure actions. These backfilling operations would be limited to filling basement level openings, and providing fill material against walls to be abandoned in place to ensure they are fully stabilized. Final site backfill, re-grading, and site restoration will be conducted during the final Site remediation/restoration. The decommissioning contractor shall also be required to install final, or stabilize existing, temporary run-on/run-off controls or erosion controls. The decommissioning contractor shall then clean up the site for trash and miscellaneous debris, and demobilize.

4 7 2 Demolition of the Stack

The current demolition planning indicates that the stack structure will be demolished using explosives. During installation of the exhaust monitoring ports, when core samples were removed, it was observed that the concrete core would not hold its shape. It was concluded that the concrete may no longer exhibit adequate design strength. This loss of design strength could prohibit the successful demolition of the stack using mechanical methods and scaffolding. This use of explosives is essential because it avoids having to perform dangerous manual labor tasks at extreme height on a scaffolding system with questionable integrity. In accordance with the *RSOP for Facility Disposition*, a Demolition Plan will be prepared that details how the explosives will be used to demolish the stack. A schedule will be established with the stakeholders to discuss the Demolition Plan with particular focus on the use of explosives.

Concerns about contractor experience, security and safeguards, and the consequences of a misdirected fall of the stack will be studied and addressed by choosing personnel with demonstrated experience, following the requirements of site safety and environmental programs, communication with regulators and stakeholders during planning, rehearsals, and engineering the amount and placement of explosives.

Two methods are possible under the explosives alternative: exploding a wedge out of the stack base and allowing the stack to lay over in a controlled fashion into a prepared area, and imploding the stack so that it collapses into its base. The demolition of the stack will be developed around the layover method, allowing the stack to fall due east toward Pond 207C, into a prepared trench. As described in the *Historic American Engineering Record No. CO-83-N* (e²M, 1997), the stack is estimated to extend 150 feet above the average adjacent grade. There is approximately 210 feet from the east side of the stack to the western edge of the Pond 207C berm, and this is adequate distance to prepare the layover area without having to breach the pond basin, and allow for an adequate margin for safety. To minimize impacts to personnel working in the local area, it is anticipated that this stack is one of the last features of the 771 Closure Project to be demolished.

The first step in site preparation for the 771 stack will be to remove the propane above ground storage tank (AST) and concrete support saddles from depression due west of the former 207C Pond. Once the tank has been removed, and on approval to excavate soil in the stack area, the Building 771 demolition subcontractor will prepare the layover area. This will involve a combined trench/soil berm feature that follows existing grade, and takes advantage of the existing depression east of the stack occupied by an AST. A typical cross section of this feature would indicate a trench excavated an estimated five feet deep and 15 feet wide, with an associated 10-foot berm on either side of the trench. Any extra soil needed to construct this feature would be obtained from soil removed to expose the subgrade portion of the stack base, augmented with soil removed to facilitate the safe demolition of subgrade features of Building 771 and Building 774 structures. Appropriate sloping of the sides of the berm will be considered in order to comply with RFETS excavation safety requirements. This berm will be constructed of loose lifts of soil material, with no formal compaction effort planned. The base of the trench will be prepared by placing

two feet of uncompacted soil along the impact zone to dissipate energy. The impact zone may be lined with a cover of wetted geotextile fabric to control dust, in addition to water spray during and after detonation

Once the explosives are placed, and additional preparatory tasks have been completed, an appropriate area of the plant will be evacuated, and the explosion will be initiated. Detonation would remove the two legs and effect a notch, with the presence of the notch combining with the stack weight to create a downward displacement. The stack structure will fall into the prepared trench. After the explosives expert has verified that no unexploded charges are present, the evacuation area will be released, and the demolition subcontractor will initiate sizing and segregation of concrete debris such that the debris can be loaded out for haulage to the PA concrete stockpiling location at the 207C Pond area. Reinforcing steel will be placed aside at the demolition site for subsequent disposition as recyclable material. A tracked excavator equipped with a vibratory hammer or hydraulic shear will demolish remaining stack base concrete down to a point a minimum of three feet below grade. Concrete debris will be removed from the portion of the stack base that will remain.

Once concrete debris has been removed from the area, the demolition subcontractor will remove the berm feature, and re-grade the site at the direction of ER. This regrading effort will only focus on leaving the site in a safe and environmentally compliant configuration. ER activities may still be required and executed in these areas. The demolition subcontractor as directed by ER will place erosion and run-on/run-off control features.

4.7.3 Demolition of the Tunnels

The exhaust tunnel connecting Building 771 and the stack will be abandoned in place by filling the interior void space with flowable backfill - soil/Portland cement mix suitable of achieving compressive strength of approximately 50 psi (historically used at the RFETS to backfill underground electrical duct bank installations). This will be performed as a decommissioning task in order to guarantee that interrelated tasks associated with the removal of Building 771 structure or the exhaust stack are not impeded or delayed.

Once the tunnel has been decontaminated to unrestricted release criteria, a cast-in-place concrete bulkhead will be placed at either end of the tunnel. Alternatively, the end of the tunnel that discharges into the base of the stack could be left open allowing the flowable backfill to fill the abandoned stack base. With either end of the tunnel effectively plugged, the demolition subcontractor would expose the concrete roof of the tunnel by removing overlying soil at twenty-five foot interval along the 100-foot length (3 locations). A hole would be punched through the concrete roof at the exposed location. Flowable fill material would then be pumped/placed through the hole, alternating placement locations to keep a uniform lift of material filling the tunnel void. Once the tunnel is full, the soil removed to expose the tunnel roof will be replaced by the demolition subcontractor, and compacted to a density appropriate for the future use of the area or as defined by ER.

The tunnels between Building 771 and Building 776 and Building 771 and Building 774 will be abandoned using the same method described above. After a tunnel has been decontaminated and verification has been made that the soils around a tunnel are below the action levels, a tunnel will be filled with flowable fill. A further verification will be made that none of the tunnel is within three feet of the final proposed grade. If any part of a tunnel is within three feet of the final proposed grade, that portion of the tunnel will be removed before placing the flowable fill.

5 WASTE MANAGEMENT

Various waste types will be generated as a result of decommissioning and ER activities within the 771 Closure Project. Waste estimates for these and other RFETS Closure Project activities are reported in the "Waste Generation, Inventory, and Shipping Forecast," which includes projections for waste volumes to be generated, stored and shipped from the Site in each fiscal year. As the Project progresses, waste volume estimates will be refined and updated on a quarterly basis, or more frequently if warranted by significant changes. This section of the DOP describes how the various wastes will be managed for facility decommissioning. Waste disposition associated with the under-building remediation contamination is addressed in Section 4.5.6.

5.1 Waste Types

A variety of regulated wastes and recyclable materials are currently managed and stored in Building 771, and additional waste will be generated during decommissioning. Table 6 provides an estimate of the types and volumes of remediation waste and recyclable materials that will be generated during decommissioning. The remainder of the section provides a brief description of each potential waste type for under building contamination remediation activities. The waste types for component removal, size reduction and decontamination activities are addressed in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*. The waste types for demolition activities are addressed in the *RSOP for Facility Disposition*.

5.1.1 Radioactive Waste

Radioactive wastes are generated at RFETS facilities during operations in areas where radioactive materials are or were formerly managed. LLW is defined as any radioactive waste that is not classified as TRU waste, high level waste, or spent nuclear fuel. The concentration of alpha-emitting radionuclides in LLW is less than 100 nanocurie/gram (nCi/g), with no specified minimum level of activity. LLW forms expected from under building contamination remediation are soils. LLW is routinely shipped to the Nevada Test Site (NTS) for disposal.

5.1.2 Mixed Waste

Mixed wastes contain both radioactive and hazardous components. These wastes will be managed in accordance with both appropriate radioactive waste requirements and appropriate hazardous waste requirements. Low level mixed (LLMW) remediation wastes that do not have a current treatment or disposal path will be managed under the Site Treatment Plan (STP). These wastes may include oils, bypass and legacy sludges and wet slurries, and waste chemicals, including acids and organic solutions.

LLMW is LLW with a hazardous waste constituent or characteristic. LLMW types expected are the same as described above in Section 5.1.1 for LLW. Solid LLMW is planned for disposal at Envirocare or another treatment, storage, and disposal facility (TSD). LLMW water may be transferred to Building 374 or other on-Site treatment unit, as described in Section 5.1.3.

Table 6. Waste/Recyclable Material Estimates for the 771 Closure Project

Category*	Sub-Category	Volume	Proposed Disposition
Rad-Regulated			
Transuranic (TRU)	TRU	1,860 m ³	Waste Isolation Pilot Plan (WIPP)
	TRU Mixed (TRM)	350 m ³	WIPP
	TRU/TRM Liquids	0.01 m ³	N/A
Low-Level (LLW)	LLW – Including Asbestos	4,110 m ³	NTS, Envirocare
	LLW – Structural Debris	2,790 m ³	NTS, Envirocare, GTS Duratek
	LLW – Surface Contaminated Objects (SCO)	10,600 m ³	NTS, Envirocare, GTS Duratek
	LLW – PCBs	1.8 m ³	Approved TSD
Low-Level Mixed (LLMW)	LLMW - RCRA solids	2.0 m ³	Approved TSD**
	LLMW - RCRA liquids	2.9 m ³	Approved TSD
Non-Rad Regulated			
Hazardous/Toxic	RCRA Solids	6 m ³	Approved TSD
	PCBs	1 m ³	Approved TSD
Sanitary	Non-Routine Sanitary	2,200 tons	Sanitary Landfill
	Friable Asbestos	880 tons	Approved TSD
	Non-Friable Asbestos	900 tons	Sanitary Landfill
Material for Recycle	Rubble/Structural Construction Debris	8,100 tons	Recycled On Site

* Waste volume estimates include demolished structures

** Assumed to include on-Site treatment facilities (e.g., RCRA Unit 374.3)

5.1.3 Wastewater

Consistent with provisions of the RFCA Implementation Guidance Document (IGD)¹⁸, wastewater generated during decommissioning will be collected and characterized to determine the appropriate management option (e.g., on-Site treatment, storage pending off-Site treatment and/or disposal). During this time, either of two process waste tanks in Building 731¹⁹ and/or the tank in Building 732²⁰ may be used as a flow-through device for RCRA regulated liquids and non-RCRA regulated liquids collected for transfer to Building 374 for treatment. Neither the tanks nor secondary containment will be modified or repaired to meet current tank system standards. Before use, appropriate tank management requirements (e.g., inspections, leak detection) will be identified in consultation with the LRA and implemented.

¹⁸ Rocky Flats Cleanup Agreement (RFCA), Appendix 3, RFCA Implementation Guidance Document (latest version)

¹⁹ Former RCRA 90-day tanks #731-651 and 731-652

²⁰ Interim Status Unit 40.16

5.2 Management Requirements for Remediation Waste

Hazardous and mixed wastes designated as "remediation" waste will be managed in accordance with the ARARs presented in Section 7 of this DOP, the referenced RSOPs, and with the remediation waste management requirements described in Building 771 Operations Order OO-771-231, which may be modified as appropriate. Hazardous and mixed waste not designated as remediation waste will be managed in accordance with the Colorado Hazardous Waste Act.

5.3 Management Requirements for Compliance Order Wastes

The Site's inventories of waste chemicals, idle equipment containing hazardous materials, and mixed residues contained in tank systems are governed by the terms and conditions of compliance orders on consent.

5.3.1 Idle Equipment

Idle equipment containing hazardous materials is managed under the Idle Equipment and Hazardous Waste Tank Compliance Order on Consent.²¹ Table 7 contains a list of the currently identified idle equipment in Building 771. Some of this equipment may be dispositioned during deactivation and additional pieces of equipment may be identified during deactivation and decommissioning. An up-to-date list will be maintained in the 771 Closure Project Files. Idle equipment containing hazardous materials, both existing and newly identified, will be managed as follows:

- Idle equipment containing hazardous materials will be posted with a sign or tag stating the following: *"This idle equipment contains material that, if released, could affect worker safety or the environment. Report any spillage to supervision immediately."*
- Idle equipment will be subject to the following inspection schedule:
 - Hazard Category 1 Monthly
 - Hazard Category 2 Bi-monthly
 - Hazard Category 3 & 4 No inspections required
- Inspections will be conducted by waste inspectors, who will ensure the equipment is posted, in good condition, and not leaking. Inspectors will document their inspections in an inspection log, noting any required corrective action(s).
- Hazardous waste contained in idle equipment will be drained or removed to the point of being empty. For surfaces of the equipment that are visible and readily accessible, the affected surfaces (i.e., surfaces that may have come into contact with hazardous waste) will be cleaned or wiped visually clean (i.e., no oily surface or sheen) to satisfy the CHWA definition of a "clean debris surface."²² In the event the clean debris surface standard cannot be met, the equipment will be cleaned or wiped down to remove as much removable contamination as reasonably possible, with the objective of eliminating significant risk from the remaining residuals.

²¹ Idle Equipment and Hazardous Waste Tanks Compliance Order on Consent (97-08-21-01), including the RFETS Idle Equipment Management Plan, 01/28/00.

²² In accordance with 6 CCR 1007-3, Part 268.45, a "clean debris surface" is defined as "a surface that, when viewed without magnification, shall be free of all visible contaminated soil or hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discoloration, and soil and waste in cracks, crevices, and pits may be present provided that such staining and soil and waste in cracks, crevices, and pits is limited to no more than 5% of each square inch of surface area."

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Table 7. 771 Closure Project Idle Equipment with Hazardous Materials Inventory

Location	Idle Equipment Number	SET/ AREA #	Description	Hazard Category	Material	Rad-Contaminated	Status ²³
771 – Room 246A	771-0021	73	Hydrofluoric Acid Evaporator	3	Hydrofluoric Acid	No	Operationally Empty
771 – Room 146	771-0062	36	Vacuum Receiving Tank	2	Nitric Acid	No	Operationally Empty
771 – Room 174	771-0063	68	Fume Scrubber Sight Glass	2	KOH	No	2 kg of KOH residue
774 – Room 102, Tank 11R	774-0001	93	Sand Filter Tank (500 gallon)	3	Sand filters/silver chrome	Yes	Operationally Empty
774 – Room 102, Tank 11L	774-0002	93	Sand Filter Tank (500 gallon)	3	Sand filters/silver chrome	Yes	Operationally Empty
774 – Room 103	774-0003	93	Caustic Storage Tank	3	KOH	Yes	Operationally Empty
774 – Room 203, Tank 42	774-0004	91	Caustic Storage Tank for Bottle Box	3 (once inactive)	KOH	Yes	Active
774 – Outside	774-0007	AM	Caustic Storage Tank	3	KOH	No	Operationally Empty

²³ Status indicates the status of the equipment at the time of the DOP approval

- The hazardous waste will be characterized in accordance with 6 CCR 1007-3, Part 262.11 Sampling methods, if used, will comply with those listed in Appendix I of 6 CCR 1007-3, Part 261. Analytical test methods, if used, will comply with those instructions contained in either EPA Manual SW-846 or RFETS "L-Procedures"
- When empty, the equipment will be characterized and managed in accordance with the applicable ARARs

5.3.2 Mixed Residues

Building 771 has an existing inventory of residues and residues mixed with hazardous waste, which are being treated and/or repackaged in preparation for shipment to the Waste Isolation Pilot Plant (WIPP). Residues are plutonium-contaminated liquids and solids that were once held in reserve at RFETS because they contain plutonium in sufficient quantities to warrant treatment for recovery of nuclear material. The mixed residue units located within the 771 Closure Project are listed in Table 8.

The existing inventory of liquid mixed residues contained in tanks and ancillary equipment has been managed under the terms and conditions of the Mixed Residue Compliance Order on Consent²⁴. As part of facility deactivation, tap and drain activities were initiated on these tanks in 1998. Tap and drain activities are approximately 80 percent complete. The tanks are currently in a Physically Empty configuration and are inspected quarterly. In the event additional inventory is discovered in a tank during decommissioning, Facility Management will develop an action plan to determine the source of the liquid, or schedule a sampling event or other appropriate action to make a hazardous waste determination. If appropriate, the action plan may include draining the liquid from the system. The 771 Closure Project Health and Safety Plan (HASP) contains pre-planning requirements for responses to possible releases from mixed residue tank systems. Pre-planning activities include identification of vital elements of the tank system, identification of locations of primary shut-off valves capable of isolating feed to a tank, and a pre-release plan, which specifies the recommended method to drain the tank system (e.g., hot tapping at a low spot, draining into bottles, or draining into another tank system). Facility operations personnel are trained to implement the pre-release plan and accompanying shut-off procedures. In the event of a release from a mixed residue tank system, the Site's RCRA Contingency Plan will be followed, as appropriate.

In accordance with paragraph 66(i) and (iii) of the Mixed Residue Compliance Order on Consent, the order is hereby terminated upon approval of this DOP modification as to each of the mixed residue tanks located in Building 771. In accordance with paragraph 66(iii), the actinide piping systems containing mixed residues must be removed as described in the Implementation Plan for Board Recommendation 94-1 before the Mixed Residue Compliance Order on Consent requirements are satisfied.

Table 8. 771 Closure Project Mixed Residue Units

Tank #	Tank Type	Room #	Unit #	System #	SET #	Physical Status ²⁵
500	P	114	93 001	6	61	PE
501	P	114	93 002	6	61	PE
502	P	114	93 003	6	61	PE
503	P	114	93 004	6	61	PE
504	P	114	93 005	6	61	PE

²⁴ Mixed Residue Compliance Order on Consent (99-09-24-01), including the Mixed Residue Tank Plan

²⁵ Physical status indicates the status of the unit when the DOP was approved

Table 8. 771 Closure Project Mixed Residue Units

Tank #	Tank Type	Room #	Unit #	System #	SET #	Physical Status ²⁵
505	P	114	93 006	6	61	PE
506	P	114	93 007	6	61	PE
507 old	P	114	93 008	6	61	PE
507 new	P	114	none	6	61	PE
508 old	P	114	93 009	6	61	PE
508 new	P	114	none	6	61	PE
509 old	P	114	93 010	6	61	PE
509 new	P	114	none	6	61	PE
510 old	P	114	93 011	6	61	PE
510 new	P	114	none	6	61	PE
529	P	114	93 012	6	61	PE
530	P	114	93 013	6	61	PE
544	A	114	93 014	15	61	Active
545	A	114	93 015	15	61	Active
546	A	114	93 016	6	61	PE
547	A	114	93 017	6	61	PE
548	A	114	93 018	7	7	PE
549	A	114	93 019	7	7	PE
550	A	114	93 020	7	7	PE
551	A	114	93 021	16	61	Inactive
552	A	114	93 022	16	61	Inactive
553	A	114	93 023	6	61	PE
554	A	114	93 024	6	61	PE
609	P	114	none	16	61	Inactive
610	P	114	none	16	61	Inactive
705	RR	114	93 025	23	60	PE
706	RR	114	93 026	23	60	PE
713	RR	114	93 027	29	60	PE
714	RR	114	93 028	23	60	PE
715	RR	114	none	29	60	PE
716	RR	114	none	29	60	PE
764	RR	114	none	12	60	PE
765	RR	114	none	12	60	PE

Table 8. 771 Closure Project Mixed Residue Units

Tank #	Tank Type	Room #	Unit #	System #	SET #	Physical Status ²⁵
949	A	114	93 029	6	61	PE
950	A	114	93 152	6	61	PE
951	A	114	93 030	6	61	PE
952	A	114	93 031	6	61	PE
953	A	114	93 032	6	61	PE
954	A	114	93 033	6	61	PE
955	A	114	93 034	6	61	PE
1001	P	146	93 035	9	36	PE
1002	P	146	93 036	9	36	PE
1003	P	146	93 037	9	36	PE
1004	P	146	93 038	9	36	PE
1005	P	146	93 039	9	36	PE
1006	P	146	93 040	9	36	PE
1007	RR	146	93 041	9	36	PE
1008	RR	146	93 042	9	36	PE
1009	P	146	93 043	9	36	PE
1010	P	146	93 044	9	36	PE
1011	P	146	93 045	9	36	PE
1012	P	146	93 046	9	36	PE
1013	RR	146	93 047	9	36	PE
1014	RR	146	93 050	9	36	PE
1019	P	146	none	9	36	PE
1020	P	146	none	9	36	PE
1022	RR	146	93 048	9	36	PE
1023	RR	146	none	9	36	PE
1024	RR	146	none	9	36	PE
1032	P	146	93 049	9	36	PE
1062	P	146	none	9	36	PE
1063	P	146	none	9	36	PE
1064	P	146	none	9	36	PE
1065	P	146	93 051	9	36	PE
1066	P	146	93 052	9	36	PE
177	RR	149	none	24	22	inactive

Table 8. 771 Closure Project Mixed Residue Units

Tank #	Tank Type	Room #	Unit #	System #	SET #	Physical Status ²⁵
208	RR	149	93 089	33	27	PE
360	RR	149	93 090	33	66	PE
361	RR	149	93 091	33	66	PE
362	RR	149	93 092	33	66	PE
363	RR	149	99 093	33	66	PE
364	A	149	93 094	33	66	PE
451	RR	149	93 095	11	66	inactive
452	RR	149	93 096	11	66	inactive
453	RR	149	93 097	11	66	inactive
454	RR	149	93 098	11	66	inactive
466	RR	149	93 099	11	66	inactive
467	RR	149	93 100	11	66	inactive
468	RR	149	93 101	11	66	inactive
469	RR	149	93 102	11	66	inactive
470	RR	149	93 103	11	66	inactive
472	RR	149	93 104	11	66	inactive
630	P	149	none	24	22	inactive
631	P	149	none	24	22	inactive
921	RR	149	93 105	24	66	inactive
922	RR	149	93 106	24	66	inactive
923	RR	149	93 107	24	66	inactive
927	RR	149	93 108	24	66	inactive
928	P	149	93 109	26	66	inactive
931	A	149	93 110	11	66	inactive
932	A	149	93 111	11	66	inactive
933	A	149	93 112	11	66	inactive
934	A	149	93 113	11	66	inactive
971	RR	149	93 114	11	66	inactive
972	RR	149	93 115	11	66	inactive
973	RR	149	93 116	11	66	inactive
974	RR	149	93 117	11	66	inactive
975	RR	149	93 118	11	66	inactive
976	RR	149	93 119	11	66	inactive

Table 8. 771 Closure Project Mixed Residue Units

Tank #	Tank Type	Room #	Unit #	System #	SET #	Physical Status ²⁵
980	RR	149	93 120	26	66	inactive
D3	P	153	none	18	67	PE
D4	P	153	none	18	67	PE
D86	RR	153	none	18	67	PE
D87	RR	153	none	18	67	PE
D88	RR	153	none	18	67	PE
1081	RR	174	93 121	10	68	inactive
1082	RR	174	93 122	10	68	inactive
1083	RR	174	93 123	10	68	inactive
1084	RR	174	none	10	68	inactive
1087	P	174	93 124	10	68	inactive
1088	P	174	93 125	10	68	inactive
1803	P	180A	93 126	17	43	PE
1804	P	180A	93 127	17	43	PE
1805	P	180A	93 128	17	43	PE
1809	A	180A	93 129	17	43	PE
1810	A	180A	93 130	17	43	PE
1811	A	180A	93 131	17	43	PE
1813	P	180A	93 132	17	43	PE
1816	P	180A	93 133	17	43	PE
1817	P	180A	93 134	17	43	PE
80	RR	180K	93 149	17	69	PE
81	RR	180K	93 150	17	69	PE
82	RR	180K	93 151	17	69	PE
83	RR	180K	93 137	17	69	PE
84	RR	180K	93 138	17	69	PE
85	RR	180K	93 139	17	69	PE

P – Pencil tank
A – Annular tank
RR – Raschig ring tank
PE – Physically empty²⁶

²⁶ "Physically Empty" is the "RCRA stable" counterpart for mixed residue tanks. "Physically Empty" means a tank or ancillary equipment has no liquid remaining after verification from personnel who are familiar with the tank system or by a proven technology (e.g., by draining at low points or by non-destructive testing). See Section 2, Mixed Residue Tank Plan

5.4 Waste Disposal

Wastes generated as a result of facility decommissioning activities will be remediation waste and packaged and characterized in compliance with RFETS waste management procedures, which implement disposal site WAC and U S Department of Transportation (DOT) packaging requirements Disposal locations will be selected by the contractor based on the properties of the particular waste stream

5.5 Waste Minimization and Recycling

Waste minimization and recycling will be integrated into the planning and management of the remediation waste generated during decommissioning Unnecessary waste generation will be controlled using work techniques that prevent the contamination of areas and equipment, preventing unnecessary packaging, tools, and equipment from entering radiological contaminated areas, and reusing contaminated tools and equipment when practical

Standard decontamination operations and processes will be evaluated for waste minimization potential and suitable minimization techniques will be implemented Property with radiological contamination or property containing hazardous materials may be reused or recycled on Site, off Site by other DOE facilities, or by publicly or privately owned facilities having proper authorization to take possession of the property

Recycling options that may be considered for materials generated during decommissioning are listed in Table 9 Materials will be recycled based on availability of appropriate recycle technologies, availability of approved facilities, and cost effectiveness

Table 9. Material Recycling Options

Material	Recycle Option	Comments
"Clean" scrap metal (not radioactively contaminated and not considered hazardous in accordance with RCRA)	Recycle through approved scrap metal vendors via contract	Material must meet receiving facility's WAC and license requirements, if any
Radioactively contaminated scrap metal	Recycle by means of metal melt process vendors	Material must meet the receiving facility's WAC and license requirements, if any
Radioactive mixed scrap material (i.e., radioactively contaminated scrap metal mixed with hazardous constituents)	261.7, recycle exemption	Currently trying to locate and approve facilities that can manage this type of material
Non-radioactive scrap metal contaminated with beryllium	Decontaminate and recycle through approved commercial facility	Decontamination must meet the release criteria prescribed by 10 CFR 850
Clean building rubble	Reuse on Site as backfill	Must meet release criteria established in the RSOP for Recycling Concrete
Clean wiring and other electrical components	Recycle through approved commercial recycling facility	Material must meet the receiving facility's WAC and license
Clean bulk plastics and glass	Recycle through approved commercial recycling facility	Material must meet the receiving facility's WAC and license
Used lead acid batteries	Recycle through approved commercial recycling facility	Material must meet receiving facility's WAC and license requirements, if any
Used oil	Recycle through approved commercial fuel blending facility	Material must meet receiving facility's WAC and license requirements, if any

An estimated 8,000 m³ of structural rubble (i.e., concrete) and 97 m³ of structural steel will be generated during decommissioning Concrete that meets the unrestricted-release criteria prescribed by the *RSOP for Recycling Concrete* will be recycled as fill material to contour the land when decommissioning activities

are completed. Concrete not meeting the unrestricted-release criteria will be disposed of at an appropriate disposal facility.

The recycled concrete will not be transported and stockpiled as indicated in the *RSOP for Recycling Concrete*. Instead, it will be verified that there is minimal reinforcing steel in the debris and the debris will be placed into depressions as backfill material. This approach will be predicated on verification of the soils meeting the action levels. The debris will generally have two flat surfaces, and will not exceed twelve inches in thickness. These characteristics would lend the material to be used as backfill in a layered approach that will meet the *RSOP for Recycling Concrete* requirements for ultimate subsidence for backfilled areas of less than one percent. Layering the backfill would mean that a uniform layer of concrete debris would be placed in a thickness not to exceed two feet. Then a layer of soil would be placed on top of the concrete, followed by a formal compaction effort to facilitate moving the concrete debris into a stable configuration, as well as forcing soil into void spaces between adjacent pieces of concrete. This layering would then continue to a point 3 feet below the anticipated final grade, with the final 3-foot lift of backfill being entirely soil.

Implementing this approach could significantly decrease cost by eliminating the steps involved with loading and transporting debris to the PA stockpiling area, size reduction at that location, and loading and transportation back to a fill site.

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6 CLOSURE OF RCRA-REGULATED UNITS

The information contained in this section supercedes the RCRA closure requirements in the RCRA permit and Interim Status Closure Plan. Approval of this DOP modification serves as the RCRA permit modification. RCRA-regulated units located within the 771 Closure Project are listed in Table 10, associated unit-specific closure information is provided in Appendix A, and schematics defining the boundaries of each tank system and treatment unit within Building 774 are included in Appendix B. These units will be closed in accordance with the closure performance standards described in this section. Closure performance standards are presented in this section for the eleven container storage units (Buildings 771 and 774), 2 gloveboxes (Building 774 only), 148 tanks (Buildings 771 and 774) and 3 treatment units (Building 774). Closure information for the incinerator located in Building 771 will be submitted in a separate closure description document (CDD) or as a minor modification to the DOP. RCRA-regulated units will be closed before building demolition.

6.1 Closure Options

Closure may be conducted in two stages: first by rendering a unit or portion of a unit "RCRA stable"²⁷ (if it is a permitted or interim status unit) or "physically empty" (if it is a mixed residue unit), then by completing the activities associated with the closure options described below.

6.1.1 Clean Closure

RCRA-regulated units may be "clean closed" by documenting the absence of contamination or by decontaminating the unit.

6.1.1.1 Historical Knowledge Confirmation

For units having a complete, detailed operating history, clean closure will be demonstrated when the following criteria are met:

- A review of the RCRA Operating Record indicates hazardous or mixed waste was never spilled in the unit, or complete documentation exists to demonstrate releases were adequately cleaned up (i.e., if a spill did occur, visible residual liquids and solid wastes were removed and the spill area was decontaminated). This justification requires LRA concurrence.
- A visual inspection of the unit and associated ancillary equipment notes the absence of hazardous or mixed waste stains and/or residuals.

²⁷ "RCRA Stable" is the first step toward closure of permitted or interim status units, whereby wastes are removed from the unit and the possibility of future waste input is eliminated. For tank systems, this means a tank and its ancillary equipment have been drained to the maximum extent possible using readily available means, with the objective of achieving less than one percent by volume holdup, no significant sludge remaining and no significant risk associated with the remaining residuals. Physical means, such as lock out/tag out or blank flanges, must then be used to ensure no waste is introduced to the system as defined in Part X E of the RFETS RCRA Part B Permit and Closure Plan for Interim Status Units.

Table 10. RCRA-Regulated Units in the 771/774 Closure Project

Unit #	Room #	SET/ AREA #	Regulatory Status ²⁸	EPA Waste Codes (from Waste and Environmental Management System)
771 1	172	AE	Permitted	See RFETS RCRA Permit
771 1	181A	AF	Permitted	See RFETS RCRA Permit
771 1	182	AE	Permitted	See RFETS RCRA Permit
771 1	183	AE	Permitted	See RFETS RCRA Permit
771 1	184	AE	Permitted	See RFETS RCRA Permit
771 1	186	AE	Permitted	See RFETS RCRA Permit
771 1	188	AE	Permitted	See RFETS RCRA Permit
771 1	Annex	AB	Permitted	See RFETS RCRA Permit
774 1	241	AF	Permitted	See RFETS RCRA Permit
774 1	210 GB Microwave	92	Permitted	See RFETS RCRA Permit
774 1	103 GB 355	93	Permitted	See RFETS RCRA Permit
774	55 Series		Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-1A	55 01	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-1RF	55 02	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-4L	55 03	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-10	55 04	93	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-4R	55 05	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-70	55 07	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-5 (F-5)	55 08	93	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
C-1	55 09	93	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009

²⁸ Regulatory status indicates the status of the unit at the time of the DOP approval

Table 10. RCRA-Regulated Units in the 771/774 Closure Project

Unit #	Room #	SET/ AREA #	Regulatory Status ²⁸	EPA Waste Codes (from Waste and Environmental Management System)
T-9	55 10	93	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-2F	55 11	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-40 (old)	55 13		Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
Filter B	55 22	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-73B	55 23	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-210A	55 24	93	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
T-71	55 25	91	Interim Status	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
774	56 Series		Interim Status	D001, D006, D007, D008, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005
T-1	56 01	92	Interim Status	D001, D006, D007, D008, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005
T-2	56 02	92	Interim Status	D001, D006, D007, D008, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005
T374A	56 07	92	Interim Status	D001, D006, D007, D008, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005
T-102	774 2	94	Permitted	D002, D004-D010, D018, D019, D022, D028, D029, D035, D038, D040, D043, F001-F003, F005, F009
T-103	774 2	94	Permitted	D002, D004-D010, D018, D019, D022, D028, D029, D035, D038, D040, D043, F001-F003, F005, F009
774 3A T-7, T-8, T-12, GB4	210	92	Permitted	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
774 3B T-201, T-202, T-203, T-204, T-40 (new)	241, 103	95, 93	Permitted	D001, D002, D004-D011, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005, F007-F009
774 3C GB40, T-13, T-14	210, 210A	92	Permitted	D001, D006, D007, D008, D018, D019, D028, D029, D035, D038, D040, D043, F001-F003, F005

6 1 1 2 Decontamination

Units to be "clean closed" by decontamination will typically be washed and rinsed, scabbled, or hydroblasted in accordance with the methods and controls specified in the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*

For units to be washed, a suitable decontamination solution will be used to remove visible waste residuals and contaminants. Following decontamination, the unit will be rinsed with clean water. The final rinsate will be tested to determine whether

- The pH of the rinsate is between 6 and 9, and
- The concentrations of priority pollutants (identified as having been managed in the unit) and heavy metals are below the Tier II action levels for groundwater, as defined in Attachment 5 of RFCA. Rinsate meeting the Tier II groundwater action levels for listed waste constituents associated with the unit and the LDR standards for characteristic waste will be deemed to be "no longer contained in" and will be managed as non-hazardous waste.

The final rinsate will not exceed a volume of two gallons per 100 ft² of surface area rinsed, and for internal surfaces, such as tank systems, the final rinsate will not exceed a volume of 5% of the capacity of the system. If test results indicate the standard has been met, the unit will be considered "clean closed." Units that cannot be decontaminated to meet the performance standard will be removed before building demolition and managed as hazardous or mixed waste.

Scabbling or hydroblasting may be utilized to decontaminate contaminated surfaces. Following decontamination, surfaces must meet the following criteria:

- A visual inspection of the unit and associated ancillary equipment confirms the absence of hazardous or mixed waste stains and/or residuals, and
- Radiological surveys verify surfaces are at or below the unrestricted release criteria identified in the *RSOP for Facility Disposition*.

Other more aggressive decontamination techniques may be utilized as necessary. Other techniques include grit blasting, high-pressure steam cleaning, scarifying, grinding and "shot" blasting.

Areas that do not meet the visual inspection criteria will be removed as hazardous or mixed debris. Areas that do not meet the unrestricted release criteria will be disposed of as non-hazardous radioactive waste.

6 1 2 Unit Removal in Conjunction with "Debris Rule" Treatment

Alternatively, RCRA-regulated units may be closed by removal and treated in accordance with the "debris rule." The debris rule applies to unit equipment or structures that have no intended use or reuse, and are slated for removal and discard. To meet the "debris rule" standard, decontamination or use of alternative treatment options will be conducted using the "abrasive blasting" physical extraction technology, or other appropriate technology identified in Part 268.45 of 6 CCR 1007-3 (Table 1, Alternative Treatment Standards for Hazardous Debris). Application of a "debris rule" technology may occur before unit removal provided the tank has no future use. If, after treatment, the equipment or structure meets the standard for a clean debris surface, it will be managed as a solid waste. In the event the standard is not met, the equipment or structure will be removed and managed as hazardous or mixed waste. Treatment residuals generated from extraction and/or destruction technologies used in the closure of RCRA-regulated units (including rinsate) will be characterized in compliance with 6 CCR 1007-3, Part 262.11 and managed accordingly.

6 1 3 Unit Removal without On-Site Treatment

RCRA units that are not decontaminated to meet the "clean closure by decontamination" standard will be removed, size-reduced (if necessary), and packaged to meet the waste acceptance criteria (WAC) of the approved disposal facility. In the event the waste cannot be shipped directly to a disposal facility, it will be stored in compliance with the remediation waste management requirements identified in Operations Order 00-771-231, as may be modified.

6 1 4 Partial Closure

As tank systems are removed, piping may be inaccessible. Inaccessible piping is typically encountered above ground in areas where ventilation and/or other piping has yet to be removed, or piping is embedded in the slab. Once the piping has been tapped and drained (e.g., vented, purged and drained), the piping will be labeled in accordance with Operations Order 00-771-236. Operations Order 00-771-236 requires piping left-in-place to have the following information displayed on the pipe or the outermost portion of the containment, at each end:

- Labels identifying the pipe as abandoned pipe,
- Identification of potentially hazardous material (previously managed in the abandoned piping), and
- Location of other pertinent information (i.e., work packages)

On a quarterly basis, personnel will inspect the "abandoned piping" to verify labeling requirements are in place. Inaccessible above ground piping will be removed before demolition, typically as part of a Dismantlement Set or Decommissioning Area.

Portions of the slab will be removed before demolition based on the contamination levels. Slab removed with embedded piping that had previously stored only characteristic hazardous waste will be managed as non-hazardous waste. Slab removed with embedded piping previously storing listed hazardous waste will be managed as hazardous waste unless the piping is segregated or appropriately treated before disposal.

The ultimate disposition of piping embedded in the remaining slab, as well as piping located beneath the slab, will occur during ER activities. Therefore, final RCRA closure of the remaining piping will be completed in accordance with the ER RSOP or other ER decision document. In order to facilitate final disposition, pertinent characterization information will be transferred to the ER program and recorded in the administrative record. The administrative record will describe the location of any remaining piping, applicable characterization information (process knowledge and sampling results), as well as any other information that will aid the ER personnel in appropriately dispositioning the piping.

6.2 Unit Removal Methods

Most RCRA-regulated units will be closed by removal. The following paragraphs provide an overview of the removal methodologies for gloveboxes and tank systems.

6 2 1 General Methodology for Glovebox Disassembly

Table 10 identifies RCRA-regulated gloveboxes located in the 771 Closure Project not previously covered by an approved CDD. For glovebox units not meeting the historical knowledge confirmation criteria identified in Section 6 1 1 1, closure will occur via disassembly and removal using one of the methods described below. Glovebox units will be removed as one piece or size reduced into smaller sections.

The level of radioactive contamination, glovebox construction, and the presence of hazardous constituents will determine the method selected. The surface contaminated object (SCO) criteria allow some items to be removed and shipped as its own container. SCO is a Department of Transportation category of low-level waste. SCO dispositioning is preferred because of the significant potential for reducing worker exposure levels and work hours required for removal. SCO dispositioning will be used when the following conditions are met:

- The majority of glovebox surfaces must be accessible by surveying equipment to ensure there is no concealed nuclear material inventory or holdup
- Both fixed and removable radioactive contamination must be below the maximum allowable DOT levels
- Inherently hazardous constituents must be removed from the exterior and interior of the glovebox, allowing the glovebox itself to be characterized as non-hazardous. Examples of hazardous constituents include leaded glass windows and lead-lined glovebox gloves. For gloveboxes that previously stored characteristic waste only, this will occur once waste residuals have been removed. Gloveboxes previously storing listed wastes will be considered non-hazardous once the "clean debris surface" standard has been met following decontamination.

In the event the SCO criteria are not met, the glovebox will be size reduced and/or packaged as LLW, LLMW, TRU or transuranic mixed waste (TRM).

The initial disassembly steps are similar for either method. In general, glovebox units will be emptied, disconnected, removed, size reduced (if required), and packaged as described below:

- Waste containers and debris will be removed
- Non-fixed equipment, tools, or other objects will be removed
- Non-essential external equipment will be removed
- Glovebox housekeeping such as cleaning, sweeping, or wiping down interior surfaces will be performed, as required

At this point, the glovebox units should be empty, clean and dry. The typical order of the subsequent removal steps will be determined by field conditions:

- Building utilities, except ventilation, will be isolated and disconnected from the glovebox (e.g., instrument air, gas, water, and electricity)
- Internal plumbing will be disconnected, drained and removed. Any liquid generated will be collected in 4-liter bottles, sampled, removed and stored until characterization is completed
- Criticality drain liquid will be removed
- Fixed hazardous materials such as lead shielding will be removed as required
- If "debris rule" treatment is feasible, internal surfaces will be wiped down and decontaminated to the extent required in accordance with Section 6.1.2. This may require extensive cleaning using approved methods. Gloveboxes meeting the "clean debris surface" standard will be disposed of as non-hazardous debris. Gloveboxes not meeting the "clean debris surface" standard will either be disposed of as hazardous debris or will be disposed of as LDR compliant hazardous debris following encapsulation in accordance with Section 268 of the Colorado Hazardous Waste Regulations (CHWR).
- The interior of the glovebox will be visually inspected for detection of any remaining visible hazardous waste or constituents
- A final radiological survey/assay will be conducted
- A spray fixative will be applied to contaminated surfaces and allowed to harden, thereby encapsulating the loose particulate matter and preventing it from becoming airborne contamination. Some spray equipment used during application may be left in the glovebox. After encapsulation, the glovebox will be removed.

- The glovebox exhaust will be disconnected from the building ventilation system
- The glovebox shell will be separated from its legs and either packaged as an SCO or transferred to a size reduction facility
- Once inside the size reduction facility, remaining hazardous waste, including leaded glass, lead-lined glovebox gloves, etc., will be removed from the glovebox using approved techniques
- The glovebox will be size reduced, as necessary, and segregated into appropriate waste streams for packaging. These streams include, but are not necessarily limited to, light metal, composite glovebox materials, combustibles, plastic, glass, leaded glass, leaded gloves, solid lead, instruments, tools and HEPA filters
- Waste will be characterized in accordance with the applicable waste generator instruction (WGI), by Item Description Code (IDC) and in accordance with applicable regulations and WAC. Absorbent may be added to the packages to absorb any residual dampness

6.2.2 General Methodology for RCRA-Regulated Tank Disassembly

The information included in this section is intended to supersede the phase II requirements in the approved CDDs for the 35 RCRA-regulated tank systems located in Building 771. This section includes tank system removal methodology, including piping strip-out, for Building 774 tank systems. Appendix A contains unit specific information for each tank system. Unit specific information includes the chemical composition of the unit and a narrative description. Appendix B contains figures identifying the boundaries for the tank systems located in Building 774.

6.2.2.1 Piping Removal

Before starting pipe removal activities, the systems will be vented, purged, drained and then drained again by tapping into low points, as required, until no additional liquid can be removed. The system should then be free of liquids. However, residual liquids may be encountered during piping removal. The removal method employed will include provisions to contain residual liquids and/or sludges, which may contain radioactive contamination. Any resulting liquids or sludges will be characterized and treated for final disposal per the applicable WAC.

If a blockage is encountered that cannot be cleared readily during the tap and drain process, additional taps will be installed to minimize the length of the blocked section. Blocked sections will be removed with provisions to contain trapped liquids that may be present. These sections will be size reduced in a manner that accommodates the possibility that trapped liquids may be released to containment. A drainage path will be established through any remaining blockages to ensure that liquid can be drained from the section. If significant blockages are encountered during tap and drain activities, piping removal may be conducted in conjunction with those activities to address the blockages.

Piping removal, size reduction and packaging activities are considered to be dynamic processes, in which improvements in technology will be implemented as a result of newly available methods or lessons learned from prior piping removal operations. The piping removal steps described below may be modified in response to actual operating conditions. Possible modifications include pipe section separation method, containment type for pipe removal, vacuum method, and containment for size reduction. In most cases, piping will be removed in the following manner:

- A glovebag or plastic sleeving will be installed around the section of piping to be removed
- Vacuum will be applied at one or both ends of a pipe section, and removal will proceed toward a vacuum source
- At a termination point (TP), the flange will be disconnected or the pipe cut and the remaining pipe stub will be contained by two layers of plastic
- The pipe sections will be separated by the best available method (e.g., disconnecting at the flanged joint, four-wheel cutter, pipe-crimping tool)

- After the pipe section ends are separated from the rest of the pipeline, the ends of the glovebag/sleeving will be twisted into a "pigtail" formation, from which the ends of the bag can be cut and taped. The pipe section will be removed with taped plastic containment at both ends.
- If any residual liquid or sludge is observed at either end of the removed pipe section, that section will be bagged immediately and taken to a size reduction containment, for size reduction and inspection. The recovered residual liquid and/or sludge will be collected. If no residual liquid or sludge is observed at either end of the pipe section, it will be taken to the size reduction area at an appropriate time.
- Piping sections will be size reduced, as necessary, using an approved cutting method. Crimped pipe sections will be size reduced.
- Pipe sections will be allowed to drain, in a vertical position, as required.
- Pipe section ends will be inspected visually to determine whether a blockage is present within the section.
- Blockages in pipe sections will be penetrated by mechanical means to drain any trapped liquid.
- Pipe sections will be drained of any remaining liquids or sludges, then placed into waste containers. Residual materials will be sampled and immobilized.

The contents and condition of the interior of the pipe section will dictate its disposition as waste. Four typical cases may be encountered:

- The interior surface is dry and contains no visible sign of hazardous waste holdup, so that the pipe section can be disposed as non-hazardous waste (for tanks previously storing only characteristic wastes).
- The pipe section contains solid residual material adhering to the interior walls, which cannot be removed readily. The pipe section will be managed as hazardous or non-hazardous waste, based on process knowledge and/or analytical results for a representative sample of the material.
- A removable blockage or mobile sludge is found, and is removed from the pipe section and sampled. EPA waste codes are assigned to the sludge based on process knowledge or analytical results, and the sludge is treated to meet applicable WAC. The pipe section will be disposed as hazardous or non-hazardous waste, after a hazardous waste determination has been made.
- Piping from listed waste tanks will be disposed of as hazardous waste.

Each IWCP work package, which will be prepared prior to the start of closure activities, will include more specific and detailed instructions for the sequence of piping removal steps, removal and size reduction methodology, and removal of residual materials from pipe sections.

6.2.2.2 Tank Removal

Tanks will be removed and/or size reduced in place after process piping has been removed, and the tanks have been drained. However, some residual solid and/or liquid holdup may be present in the tanks. The descriptions below contain specific provisions to address this possibility, incorporating applicable regulatory requirements and precautions to prevent worker exposure or release of holdup material to the environment.

Tanks may be packaged in one piece or size reduced. Typical waste streams to be generated include light metal, plastic-lined metal, solid lead, combustibles, glass and plastic.

Removal of the tanks is described in the following subsections, according to tank type and relative size. The following disassembly steps are typical and may be altered based on field conditions or lessons learned.

6 2 2 3 Pencil Tank Removal

Pencil tanks are handled in a manner similar to that for large diameter piping. In a few cases, the tank may be size reduced in place because of its size or other circumstances, however, for the majority of cases, activities are as follows:

- Containment will be placed around the vacuum/vent line, and the tank will be disconnected from the exhaust header
- The tank will be disconnected from its supports
- The tank will be moved to the size reduction glovebox, and introduced into the glovebox via a "bag-in" procedure
- The tank will be cut to facilitate handling and packaging. The ends will be separated from the tank body to facilitate inspection of the interior, cleaning and removal of residual materials
- Tanks or tank sections will stand on end in a drip pan to drain residual liquid and mobile sludge. The material will be placed into containers for further characterization and disposal
- Each tank or tank section, now open at both ends, will be visually inspected. The interior will be wiped dry. Incidental liquids may be immobilized with absorbent or collected in Kim-wipes as wet combustibles
- Additional tank cleaning, if required, will be conducted during size reduction. The options for disposition of the tank sections as waste are described in Section 6 3
- The tank sections will be further size reduced as necessary, and then segregated for final waste characterization and packaging. Absorbent will be added to the packaging to absorb any residual dampness. The tank sections will be packaged in accordance with the applicable WGI

6 2 2 4 Annular Tank Removal

The dual-wall design of annular tanks leads to special considerations and precautions for size reduction and inspection for residual material remaining inside the tank, which are somewhat more complex than for the other types of tanks. The best available technology will be used for the disassembly and removal of tanks. For example, while relatively small annular tanks may not require size reduction to fit into waste crates, some cutting will be necessary to facilitate inspection of the tank interior for the presence of residual material holdup. In some cases, large tanks or those with special circumstances may be size reduced in place. Typical activities for these tanks are as follows:

- Containment will be placed around the vacuum/vent line, and the tank will be disconnected from the exhaust header
- The tank will be disassembled from the floor mountings and brought to the size reduction facility, where one or more viewing ports are cut to facilitate inspection of the tank interior
- The tank will be visually inspected
- If no residual material is found, the tank interior may be sprayed with a fixative before proceeding with size reduction
- If residual material is discovered inside the tank, the tank may be cut into sections to provide access to the residual material
- Residual material (solids and/or sludge) will be removed from tank sections and placed into containers for further characterization and disposal. Incidental liquids may be collected in Kim-wipes as wet combustibles. Waste characterization criteria for the tank pieces, based on the content and condition of any residual material found in them, are described in Section 6 3
- After the residual material has been removed, the tank interior may be sprayed with a fixative before proceeding with size reduction
- The tank sections will be further size reduced, as necessary, then segregated for final waste characterization and packaging. Absorbent may be added to the packaging to absorb any residual dampness. The tank sections are packaged in accordance with the applicable WGI

6 2 2 5 Raschig Ring Tank Removal

Raschig ring tanks will be inspected visually and/or by real time radiography (RTR) for the presence of liquid/mobile sludge. Small tanks may be placed directly into a shipping container with the raschig rings in place. Each tank packaged in this manner will be examined by RTR to verify the absence of free liquids and/or mobile sludges. In the event the tank fails RTR, the tank will be returned either to Building 771 or 774, and the raschig rings will be removed. Typical activities for Raschig ring tanks are as follows:

- Containment will be placed around the vacuum/vent line, and the tank is disconnected from the exhaust header
- The tank will be disconnected from its supports
- The tank will be brought to the size reduction facility, where the rings will be removed and the interior of the tank inspected
- If no residual material is found upon inspection, the tank will be size reduced as necessary to fit into a waste container. The interior is wiped dry. Incidental liquids may be immobilized in absorbent or collected in Kim-wipes as wet combustibles. The options for disposition of dry tanks or tank sections as waste are described in Section 6 5 2 5 below
- If residual material is found in the tank, the methodology for its removal is determined. This is likely to include cutting of the tank into sections in order to isolate the residual material in one or two sections for ease of removal
- The cut tank sections will stand on end in a drip pan to drain residual liquid and mobile sludge. Non-mobile sludge is removed by mechanical means. Residual material (sludge and/or solids) will be placed into containers for further characterization and disposal
- After residual materials have been removed, each tank or tank section will be visually inspected. The interior will be wiped dry. Incidental liquids may be immobilized in absorbent or collected in Kim-wipes as wet combustibles
- Size reduction, as necessary for waste packaging, will be conducted using the best available technology
- The tank or tank sections are segregated for final waste characterization and packaging under the options listed in Section 6 3. Absorbent may be added to the packaging to absorb any residual dampness. The tank sections will be packaged in accordance with the applicable WGI

6 2 2 6 Removal of Other Tanks

Three options exist for the removal of tanks that do not contain raschig rings, are not annular, or pencil tanks:

- Package the tank in one piece as a SCO,
- Package the tank in one piece because size reduction is not necessary, or
- Size reduce the tank into sections for packaging

Selection of an option will be based on the level of radioactive contamination, tank construction and the presence of hazardous constituents. The SCO method is desirable because of a significant reduction in both worker exposure levels and staff-hours required for size reduction and removal activities.

After the vacuum/vent line is disconnected, the tank will be packaged in one piece in place, with containment provided on site as necessary. The tank may be designated as an SCO if it meets the criteria. If the tank cannot be packaged in one piece, it will be size reduced and the waste streams segregated for packaging, either in place or within the size reduction facility.

6.2.2.7 General Conditions for Tank Sections and Residual Materials

The condition of the tank interior and the composition of residual material inside any of the tanks will dictate that tanks disposition as waste. Four typical cases may be encountered:

- The interior surface is dry and contains no visible sign of hazardous waste holdup, so the tank can be disposed as non-hazardous waste (for tanks previously storing only characteristic waste)
- For tanks previously storing listed wastes, the tank sections typically will be decontaminated in accordance with Section 6.1.1.2 and disposed of as non-hazardous debris. If decontamination is not feasible, the tanks will be disposed of as hazardous or mixed waste.
- The tank contains solid residual material adhering to the interior walls, which cannot be removed readily. The tank will be managed as hazardous or non-hazardous waste, after a hazardous waste determination has been made based on the analytical results for a representative sample of the material.
- A mobile sludge is found and is removed from the tank and sampled. EPA waste codes are assigned to the sludge based on process knowledge or analytical results. The sludge will either be treated to meet applicable waste acceptance criteria or stored on-site pending ultimate disposition. The tank will be disposed as hazardous or non-hazardous waste, after a hazardous waste determination has been made.
- Each IWCP work package, which will be prepared prior to the start of tank removal activities, will include more specific and detailed instructions for the sequence and methodology of tank removal, size reduction and separation of residual material from tank sections.

6.3 DISPOSITION OF CLOSURE-RELATED WASTES

Metal and other types of waste generated during closure activities will be managed as remediation waste. It is assumed that the Site's waste management and treatment systems will be available to receive wastes generated by these closure activities. If deemed appropriate, Building 771/774 may develop treatment systems for select waste streams.

Glovebox components and pieces that are radioactively contaminated will be managed in accordance with the requirements of the RFETS Radiological Control Manual and Health and Safety Practices Manual, and will be packaged for disposal in accordance with applicable waste acceptance criteria.

Non-SCO glovebox metal waste will be assayed for categorization as either LLW or TRU, depending on the amount of actinide present, and will be characterized in accordance with applicable regulations. Size-reduced glovebox sections likely will be categorized as TRU waste and packaged for disposal at WIPP. The presence of metal pieces with lead shielding will cause that metal waste to be labeled as mixed waste.

A glovebox shell that has met the SCO criteria does not require additional assay. It is a non-hazardous LLW and will be packaged for disposal at NTS.

Other segregated waste types identified in the WGIs will be characterized, placed into waste containers and managed in accordance with applicable regulations and the Site Waste Management Programs. These waste drums and crates will be analyzed by non-destructive assay to categorize them as LLW or TRU waste. They will be placed in appropriate on-Site storage areas before off-Site disposal. If mixed waste is generated for which treatment/disposal options do not currently exist, it will be added to the Site Treatment Plan (e.g., LLW with actinide activity levels between 10 and 100 nCi/g).

6.4 Professional Engineer Certification

Within 60 days of completing closure of the final hazardous waste unit in Building 771/774, an independent, registered Professional Engineer (P E) will certify the facility has been closed in accordance with Section 6 1 1 2 Individual unit closures will not require a P E certification

6.5 Closure Documentation

RCRA unit closure activities will be documented in the Pre-Demolition Survey Report, which will be completed before building demolition Upon final closure of each RCRA-regulated unit, the Site's Master List of RCRA Units will be updated to reflect the new closure status of the unit and the unit will be removed from the RCRA Part A Application and Part B Permit in accordance with the applicable regulations

7 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Decommissioning and ER activities conducted at RFETS must comply with the ARARs under the CERCLA²⁹ ARARs have been identified for the complete scope of decommissioning activities, including demolition, and they are contained within the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*³⁰ and the *RSOP for Facility Disposition*³¹ Section 7.1 identifies the ARARs for the under-building remediation activities, which are detailed in Section 4.5 of this DOP

7.1 Under-Building Contamination Remediation

Under-building contamination remediation will consist of source removal and is expected to be similar to other Site accelerated actions. The term source removal refers to the source of the under building contamination. Once the source is removed and the affected material is removed or remediated, source removal has been completed. The substantive Federal and State ARARs are identified in the following paragraphs:

7.1.1 Chemical-Specific Requirements and Considerations

The only chemical specific ARAR is the National Emission Standards for Hazardous Air Pollutants (NESHAP) for radionuclides. The NESHAP asbestos requirement has been addressed based on the assumption that asbestos-containing materials will be removed from the UBC areas before initiating excavation.

7.1.1.1 NESHAPs

The 40 CFR §61.92 is applicable and requires that no member of the public receive more than 10 mrem per year above background from airborne sources of radiation. Demonstration of compliance with 40 CFR §61.92 is performed on a Site-wide basis taking into consideration Site sources. After pre-remedial characterization is complete, air monitoring requirements for Buildings 770, 771, 771C, and 774 remedial actions will be determined and implemented if necessary.

7.1.1.2 Action Level Framework

The Tier 1 soil action levels for VOCs and radionuclides provided in the RFCA Action Level Framework are the cleanup target levels (see Table 5).

7.1.2 Action-Specific Requirements and Considerations

The following action-specific requirements and considerations were evaluated specific to the UBC source removal at Buildings 770, 771, 771C, and 774:

- Identification and listing of hazardous wastes,
- Definition of remediation waste,
- Land disposal restrictions,

²⁹ Certain State of Colorado Radiation Control Regulations pertaining to decommissioning and environmental releases may be relevant and appropriate to building decommissioning and environmental restoration activities, particularly the cleanup of the soils. The RFCA parties are finalizing this list and a subsequent modification to the documents referenced will be required.

³⁰ The RFCA Standard Operating Protocol for Facility Component Removal, Size Reduction, and Decontamination Activities is currently undergoing public comment and is scheduled for approval in December 2000.

³¹ The RFCA Standard Operating Protocol for Facility Disposition, approved October 5, 2000.

- Temporary unit tank and container storage, and
- VOC and particulate emission controls

7 1 2 1 Identification and Listing of Hazardous Waste

Requirements governing the identification and listing of hazardous wastes are applicable to the source removal (See 6 CCR 1007-3, §261) Based upon process knowledge and characterization data, the contaminated soil may contain F001/F002 solvents that were released from the building processes

7 1 2 2 Remediation Waste

The definition of remediation waste is applicable to wastes and media generated in conjunction with this action Remediation waste is defined as *"all solid and hazardous wastes, and all media (including groundwater, surface water, soils and sediments) and debris, which contain listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action "* (See §260 10)

7 1 2 3 Closure Requirements

This discussion addresses the requirements necessary to meet the closure performance standards for the temporary unit (TU) tanks and containers (§264 553(a)) Following the completion of excavation activities, any TU tanks and containers will be decontaminated according to Site procedures In general, any large-scale decontamination will take place at the PA decontamination facility, or the main decontamination facility located in the contractor's yard TU tanks and containers will be managed and closed to meet the substantive requirements of RCRA TU tanks, containers, and any ancillary equipment that come into contact or contain liquids associated with remediation waste will be managed to control the waste and prevent releases into the environment If the tanks, containers, and equipment have further use, they will be moved to one of the approved decontamination facilities and cleaned in accordance with applicable procedures At the end of their useful life, the tanks, containers, and equipment that were exposed to remediation waste will be cleaned to meet the requirements of the Section 6 of this DOP If cleaning efforts fail to produce results as set forth in the closure plan, the tank, container, or equipment will be disposed of as hazardous waste

7 1 2 4 Volatile Organic Compound and Particulate Emission Controls

The Colorado Air Pollution Control Regulations require the application of reasonably available control technologies (RACT) to new sources of VOC emissions (5 CCR 1000-3, Regulation No 7, "Reg 7") VOCs may be emitted during soil excavation and transport The Colorado Air Quality Control Commission has found that for sources of VOCs less than 1 ton, RACT typically requires no controls Based on the low concentrations of VOCs anticipated in the soil, specific VOC control measures will not be employed during excavation and transport However, VOC controls will be put into place if contaminant concentrations determined during the characterization or remediation activities indicate that these are appropriate

Regulation 7 requires that the transfer of any liquid containing VOCs to a tank, container, or vehicle compartment with a capacity exceeding 56 gallons be accomplished using submerged or bottom filling equipment to minimize splashing This requirement will potentially apply to dewatering of the excavation

7 1 2 5 Location-Specific Requirements and Considerations

No location-specific requirements or considerations unique to the activity were identified and Site procedures will be followed

8 ENVIRONMENTAL CONSEQUENCES

RFCA mandates incorporation of National Environmental Policy Act (NEPA) values into RFCA decision documents. The following paragraphs summarize the results of the environmental impact analysis, which was performed for the UBC remediation activities. Environmental consequences have been identified for the complete scope of decommissioning activities, including demolition, and they are contained within the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities* and the *RSOP for Facility Disposition*.

The UBC remediation activities will be performed before the demolition of the buildings. Because the remediation will occur within a contained area, potential environmental impacts are limited. Air emissions can be better controlled, and the contaminated areas will be protected from rain, wind, and other environmental factors. Human health and safety will be protected through implementation of mandatory Site safety requirements.

8.1 Geology and Soils

Although the primary emphasis of the action is to remove soils underlying the buildings, the impact on soils and geology will be minimal. Contaminated soils will be removed, and uncontaminated soils will be placed back into the excavations. Process lines under the buildings will be removed along with associated contaminated soils. Contaminated lines and soils will be removed to the perimeter of the building, uncontaminated lines will be grouted or foamed and left in place. Because the basement or below grade areas will be filled with an approved fill material, remaining uncontaminated lines will not likely provide a future pathway for water migration. Additional contamination of soils during the UBC remedial activities is not expected because the remainder of the building structure will have been decontaminated before excavation. Soils and geologic features outside of the building perimeters will not be affected.

8.2 Air Quality

Air quality may be affected during the UBC remediation due to the release of dust, radionuclides, and other hazardous air pollutants. The process of cutting, moving, and containerizing concrete and soils will free contaminants and fugitive dust within the building. These air emissions would be a health and safety concern for workers; air contaminants in the buildings are addressed by the Site Health and Safety Program. The use of PPE and industrial hygiene monitoring will be used as necessary.

The remedial actions will occur after ventilation ducting is removed. The exterior building walls and roof will largely remain intact during the remedial activities, but doors and windows may have been removed. To ensure that air pollutants generated by the activities remain within safe release limits, outdoor ambient air monitoring will be conducted in accordance with the *Integrated Monitoring Plan*. If a monitoring limit is exceeded, operations will be stopped, the reason for the release will be determined, and actions will be taken to prevent further releases.

Fugitive dust and other criteria air pollutants will be generated during the transport of contaminated concrete and soils to storage and disposition facilities. Although 200 to 230 shipments may be needed to remove contaminated soils, the criteria emissions will be generated over an extended period of time (i.e., an estimated 114 days), and will therefore not be an air quality concern.

8.3 Water Quality

Surface water will not be impacted, since the activities will occur inside buildings and materials or wastes removed from the building will be in containers. Groundwater quality will not be affected during the remedial activities. However, groundwater may flow into the excavations. If water flows into the excavations, it will be removed and characterized. Water will be managed in accordance with *Control and Disposition of Incidental Waters* (1-C91-EPR-SW 01). To ensure that groundwater is not contaminated, groundwater monitoring will be conducted. If monitoring limits are exceeded, operations will be stopped until the source of the contamination can be identified and further release prevented. Because water will be properly managed, adverse environmental impacts will be avoided.

8.4 Human Health and Safety

Risks to worker health and safety during the UBC remediation will be similar to risks faced by workers during decontamination and disposition activities. Workers will still be exposed to heavy machinery and repetitive motion tasks. A unique physical hazard may exist if building support structures must be removed (e.g., to remove underlying contaminated concrete and soils). If contamination has traveled under an interior pilaster, soil will be removed up to the pilaster, a saddle will be built to transfer any loading that may occur, and the pilaster will be removed. Removal of the contaminated soil will follow. This procedure will increase the safety risk to workers in the immediate area. Although the procedure is unusual, the physical hazard (e.g., building collapse) associated with such activities will be managed through appropriate engineering and administrative controls.

Workers may be exposed to chemical and radiological hazards. These risks will be managed through the appropriate use of PPE, engineering controls, and administrative controls, as described in Section 4.5.5, Worker Health and Safety. Because the existing structure will remain intact during the UBC remediation, contaminants will be better contained and the potential impact to non-involved workers and the public will be lessened.

8.5 Plants and Animals

Because the UBC remediation will be done within the confines of the existing structure and foundation of Building 771, plants and animals will not be affected.

8.6 Waste Management

Waste management includes temporary storage and transportation needs. Remedial activities will generate radiologically contaminated wastes and hazardous wastes that will require storage and off-site transportation and disposal; uncontaminated concrete and soils will be placed back into excavations at the building site. As much as 10,000 cubic yards of waste may be generated during the removal of contaminated concrete and soils.

Contaminated concrete and soils removed during the remediation will be placed in appropriate containers and stored on-site until moved to permitted storage areas on-site or shipped to approved off-site disposal sites. Wastes will be characterized, stored, and disposed of in accordance with Site waste management procedures, and state and federal regulations. Temporary storage at the point of generation should not be a concern, due to adequate floor space for storage within the facilities. However, subsequent movement to other Site storage locations and eventual shipping will be cumulative with the generation and movement of other Site wastes.

Waste minimization will be used in the planning and management of the wastes. Remedial activities will be evaluated for waste minimization potential and suitable minimization techniques will be implemented, as practicable.

8.7 Historic Resources

Building 771 has been identified as historically significant as an essential component of the weapons production activities at RFETS. Negotiation to determine the appropriate mitigative measures between DOE and the State Historic Preservation Officer have been completed, and Building 771 is subject to documentation requirements (construction drawings and photographs). The required documentation for Building 771 has been completed in the *Historic American Engineering Record for the Rocky Flats Plant Historic District* (HAER-CO-83-T), and no further action is needed regarding historical resources.

8.8 Noise

Noise levels will increase within the buildings as remedial activities occur. However, workers involved in those activities will be required to use appropriate hearing protection devices during such activities. Because the higher noise levels will take place indoors, collocated workers and the public will not be affected.

8.9 Socioeconomic Effects

Workers needed to complete the remediation will be a small percentage of workers employed during decommissioning and other activities at Site buildings. The remedial activities will also be temporary. Therefore, a socioeconomic impact will not be noted.

8.10 Cumulative Effects

Cumulative effects are most likely to be noted in the management of waste. About 10,000 cubic yards of hazardous, LLW, and LLMW may be generated during remedial activities. Most of the waste would be contaminated concrete and soils that are removed from the excavations.

Waste storage may become a concern if waste is moved to other storage locations at RFETS at about the same time that other Site activities are generating similar wastes. However, about 10,500 cubic yards of LLW and LLMW were managed and disposed of during July 2000 (K-H, 2000a), indicating that the 10,000 cubic yards of waste from UBC activities, which will be generated over about four months, can be properly managed.

Shipment of the wastes will require up to about 230 truck shipments, which if evenly spread out for four months would result in an additional two to three truckloads per work day. Because roadways adjacent to the Site (Highway 93 and Indiana Avenue) are currently rated poor (JeffCo, 2000), the added traffic would have an adverse impact. However, the truck traffic will increase while the Site's commuter traffic begins to decrease (the result of decreasing worker numbers at the Site). Since commuter traffic comprises about one-third of traffic on adjacent roads (JeffCo, 2000), the impact of the truck shipments will likely be offset. In addition, since the additional trucking will be temporary, the adverse impacts to local traffic will be temporary.

8.11 Mitigation Measures

The following mitigation measures will be taken to lessen potential negative impacts to personnel safety and the environment

- PPE and other personal safety equipment will be used as required to maintain safe working conditions,
- Engineering and administrative controls will be implemented to prevent unsafe conditions if walls or other supports are affected during UBC remediation, and
- Exterior building walls will remain intact throughout the excavation, therefore reducing the release of contaminants into the surrounding environment

8.12 Unavoidable Adverse Effects

The proposed activities will unavoidably increase air emissions, water discharges, localized noise levels, radiation and chemical exposures to workers, and the potential for industrial accidents. All of these increases will be temporary.

8.13 Short-Term Uses and Long-Term Productivity

Cleanup of spill sites within the buildings will improve the long-term productivity of the Site. Contamination that could migrate elsewhere will be removed, a potential source of soil and water contamination will no longer exist. Use of the Site for a variety of other possible future short- and long-term purposes is supported by the remedial actions.

8.14 Irreversible and Irretrievable Commitments of Resources

The use of funds, labor, equipment, fuel, tools, PPE, waste storage drums, and similar items are resources that will be irreversibly and irretrievably committed.

9 IMPLEMENTATION SCHEDULE

The recent Site-wide re-baselining effort has resulted in the development of a detailed schedule and basis of estimate for completion of the 771 Closure Project. A copy of this schedule is provided in Appendix C. The schedule is not an enforceable part of this DOP, and DOE or its contractor may alter the schedule without prior notification to or approval by the LRA. Significant schedule changes will be shared with the LRA as part of the RFCA consultative process.

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10 RECORDS DISPOSITION

The 771 Closure Project records consist of the CERCLA AR File, the RCRA Operating Record, the Closure Project Files, and the Decommissioning Closeout Report

10.1 CERCLA Administrative Record File

This section identifies the documents that constitute the AR File for the 771 Closure Project. Upon completion of the public comment period, comments received from the public will be added to the AR File, along with the responsiveness summary and the LRA approval letter. LRA approval of this DOP and associated major and minor modifications constitutes approval of the AR File.

This major modification will be submitted for public comment. This major modification and comment received from the public will be added to the AR, along with the responsiveness summary and the LRA approval letter. LRA approval of this major modification into the DOP constitutes approval of the documents being added to the 771 AR. The following documents will be added to the 771 Closure Project AR for this major modification:

- 771 Closure Project Reconnaissance Level Characterization Report Supplement
- 771 Closure Project DOP modification Responsiveness Summary
- Final 771 Closure Project DOP modifications
- JeffCo, 2000 *Jefferson County, Colorado, Northwest Quadrant Study Phase I Final Report*, http://projects.ch2m.com/jeffco/nw_quadrant/nwq_phase_1.htm March 2000
- EG&G 1995a, *Geologic Characterization Report for the Rocky Flats Environmental Technology Site*, 1995
- EG&G 1995b, *Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site*, 1995

The following information repositories have been established to provide public access to the 771 Closure Project AR:

U S Environmental Protection Agency (EPA)
Region VIII
Superfund Records Center
999 18th Street, Suite 500
Denver, Colorado 80202-2466
(303) 293-1807

Rocky Flat Citizens Advisory Board (RFCAB)
9035 Wadsworth Parkway
Suite 2250
Westminster, Colorado 80021
(303) 420-7855

Colorado Department of Public Health and
Environment (CDPHE)
Information Center, Building A
4300 Cherry Creek Drive South
Denver, Colorado 80220-1530
(303) 692-3312

U S Department of Energy Rocky Flats
Public Reading Room
Front Range Community College Library
3645 West 112th Avenue, Level B
Westminster, Colorado 80030
(303) 469-4435

10.2 RCRA Operating Record

RCRA records, including inspection records, will be maintained with the existing Building 771 RCRA Operating Record. Upon completion of the 771 Closure Project, the RCRA Operating Record will be transferred to Site Records Management for storage.

10.3 Closure Project Files

Project-specific documents will be stored in the 771 Closure Project Files until final closure is complete, at which time the Closure Project Files will be processed through Site Records Management and archived. The Closure Project Files will contain characterization documentation, inventory sheets, project correspondence, comment resolution, IWCP work packages, and additional information that is a direct result of the work involved in the project. Maintenance of the Closure Project Files is a Site requirement.

10.4 Decommissioning Closeout Report

A Decommissioning Closeout Report will be prepared for the 771 Closure Project after decommissioning work has been completed and analytical data received. The report will consist of a brief description of the work completed, including any modifications or variations from the original decision document. The report will also contain analytical results, including the results of confirmatory sampling, as well as a description of the quantity and characteristics of the waste generated and how the waste is stored or disposed. The expected outline for the Closeout Report is shown below. The format may change to meet the needs of the project.

- Introduction
- Remedial action description
- Dates and duration of specific activities (approximate)
- Verification that remedial action goals have been met
- Verification of treatment process (if applicable)
- Radiological analysis (if applicable)
- Waste stream disposition
- Site reclamation
- Significant deviations from the decision document
- Final disposition of wastes (actual or anticipated)
- Next steps (e.g., interim monitoring, transfer to Environmental Restoration Program)

When completed and approved by DOE and the LRA, the Decommissioning Closeout Report will be submitted to the 771 Closure Project AR Post-decisional File.

11 COMMENT RESPONSIVENESS SUMMARY

The responsiveness summary addressing public comments on the final draft version of this DOP will be included in this section

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12 GLOSSARY OF TERMS

Following are terms that are unique to this RFCA decision document. For the definitions of other terms used in this and other RFCA decision documents, refer to the *RSOP for Recycling Concrete*, the *RSOP for Facility Disposition*, and the *RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities*.

Decommissioning Area Small, manageable grouping of similar systems, equipment, and areas or rooms that may be worked independently. Dismantlement Sets contain less than 2,000 dpm removable contamination and are decommissioned by Building Trades.

Dismantlement Set Small, manageable grouping of similar systems, equipment, and areas or rooms that may be worked independently. Dismantlement Sets contain greater than 2,000 dpm removable contamination and are decommissioned by Steelworkers.

APPENDIX A

BUILDING 771/774 UNIT-SPECIFIC INFORMATION SHEETS

Unit 774 2 – Liquid Waste storage

A Location	Building 774 – Room 220
B Chemical Composition	Mixed waste oils contaminated with various solvents and PCBs
C Radioactinide Contamination	Low levels of contamination
D Tanks Involved	Tanks T-102, T-103, and T-104 Room 220
E Gloveboxes Involved	None
F Other Components	Staging area for drums and other containers whose contents were to be transferred into tanks
G Compatibility Issues	N/A
H Narrative Description	These tanks were used to store mixed waste oils contaminated with various solvents and PCBs. The waste oils were generated in various manufacturing processes and machinery at RFETS. Waste managed in these tanks was destined for destruction on site or transfer to off-site disposal facilities. This unit also includes a container staging area where containers of waste were staged to facilitate transfer of their contents into the storage tanks.

Unit 774 3A – Miscellaneous waste handling and solidification

A Location	Building 774 – Room 210 and 212
B Chemical Composition	Aqueous mixed waste containing heavy metals
C Radioactinide Contamination	Low levels of contamination
D Tanks Involved	Tanks T-7, T-8, Room 210, and T-12, Room 102
E Gloveboxes Involved	Glovebox 4, Room 210
F Other Components	None
G Compatibility Issues	N/A
H Narrative Description	This treatment process is used to immobilize aqueous mixed waste with cement to create a waste form that is suitable for disposal. Specific wastes treated in this unit include complex aqueous wastes that are incompatible with other aqueous wastes, wastes high in chloride concentration or wastes otherwise not suitable for treatment in the aqueous waste treatment process.

Unit 774 3B – aqueous waste treatment

A Location	Building 774 – Rooms 103 and 241
B Chemical Composition	Aqueous mixed caustic or acidic waste contaminated with low concentrations of heavy metals and solvents
C Radioactinide Contamination	Low levels of contamination
D Tanks Involved	Tanks T-40, Room 103, and Tanks T-201, T-202, T-203, and T-204, Room 241
E Gloveboxes Involved	None
F Other Components	None
G Compatibility Issues	N/A
H Narrative Description	This treatment unit was used to process acidic and caustic aqueous mixed wastes through precipitation and neutralization. Process wastes were batched with reagents to remove radioactive contaminants through precipitation. Effluent waste was then neutralized and transferred to Building 374 for evaporation.

Unit 774 3C – Organic and Sludge Immobilization System

A Location	Building 774 – Rooms 210 and 210A
B Chemical Composition	Mixed waste oils contaminated with various solvents
C Radioactinide Contamination	TRU levels of contamination
D Tanks Involved	Tanks T13, T14, Room 210
E Gloveboxes Involved	OASIS Glovebox, Room 210
F Other Components	Mixer, Reagent Hopper, Vacuum Trap
G Compatibility Issues	N/A
H Narrative Description	The Organic and Sludge Immobilization System (OASIS) was used to treat TRU Mixed waste oils. The waste oils were transferred from various building via pipelines to Tanks T-13 and T-14 in Room 210. The waste oils were then transferred to a solidification unit located in the OASIS glovebox. The oils were placed in a drum in the bottom of the glovebox where Gypsum cement, a dry accelerator and liquid emulsifier were mixed with the waste. The mixing process was aided by a large mixer, which was activated until the mixture began to set up. Finally, the mixer was removed from the drum. The drum was then removed from the drum port and ultimately placed in a permitted storage unit.

Unit 55 – Old Aqueous waste processing

A Location	Building 774 – Rooms 102, 202, and 203
B Chemical Composition	Aqueous mixed caustic or acidic waste contaminated with low concentrations of heavy metals and solvents
C Radioactinide Contamination	Low levels of contamination
D Tanks Involved	Tanks C-1, F-5, T-9, T-10, T-210A, Room 102, T-1A, T-1RF, T-2F, T-4L, T-4R, T-70, T-71, T-73B, and GB-6 (reservoir), Room 202, and Old T-40, Room 203
E Gloveboxes Involved	GB-6
F Other Components	None
G Compatibility Issues	N/A
H Narrative Description	This treatment unit was used to process acidic and caustic aqueous mixed wastes through the late 1980s. Process wastes were batched with reagents to remove radioactive contaminants. All of the tanks in this unit were declared "RCRA Stable" in January of 1999.

Unit 56 – Old Organic and sludge immobilization system

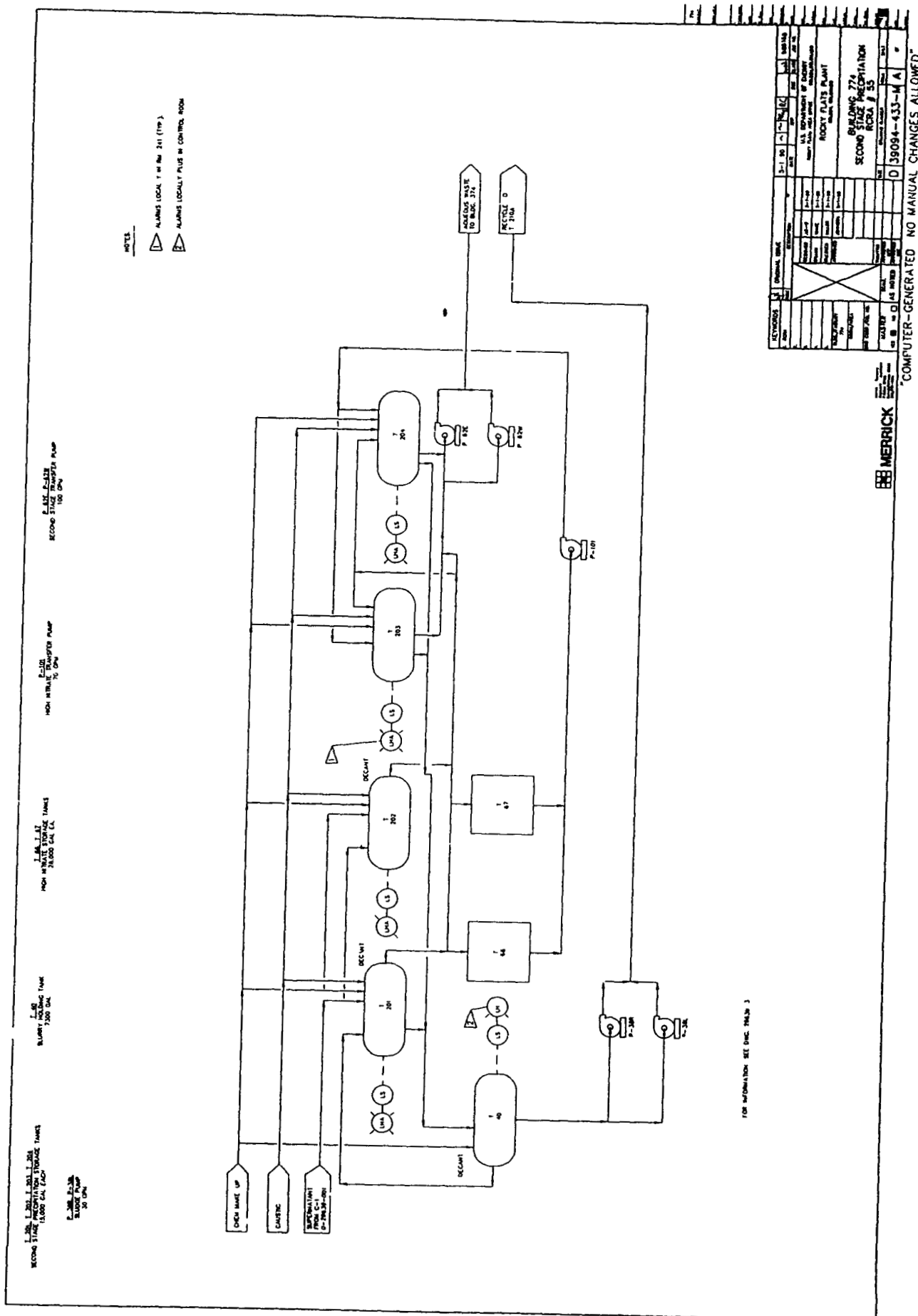
A Location	Building 774 – Room 210
B Chemical Composition	Mixed waste oils contaminated with various solvents
C Radioactinide Contamination	TRU levels of contamination
D Tanks Involved	Tanks T-1, T-2, and T374A, Room 210
E Gloveboxes Involved	None
F Other Components	None
G Compatibility Issues	N/A
H Narrative Description	These tanks were used to store feed waste for the OASIS process until the early 1980s, when they were taken out of service and replaced with T-13, and T-14. These tanks were declared RCRA Stable in January, 1999.

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APPENDIX B

BUILDING 774 RCRA UNIT DRAWINGS

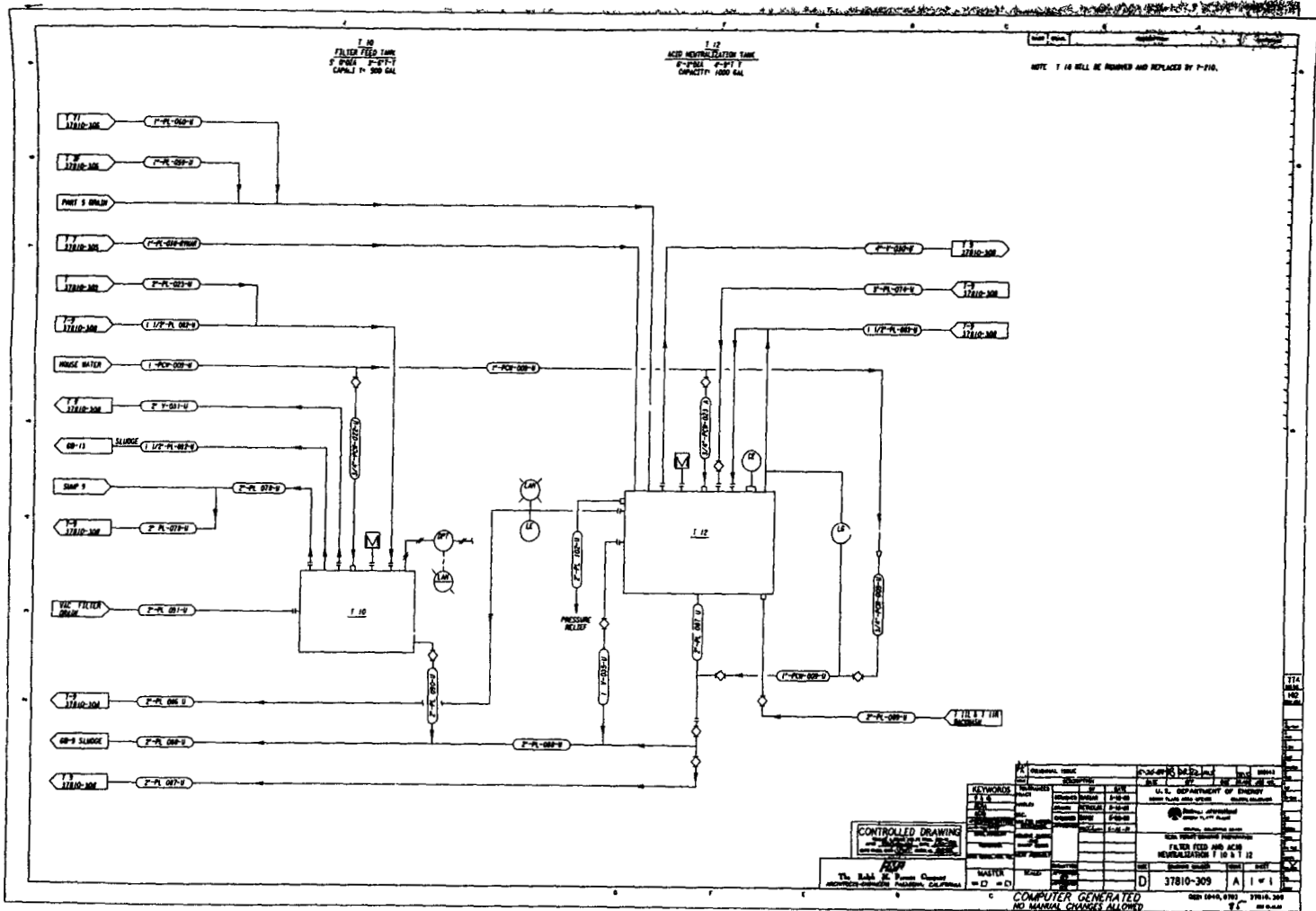
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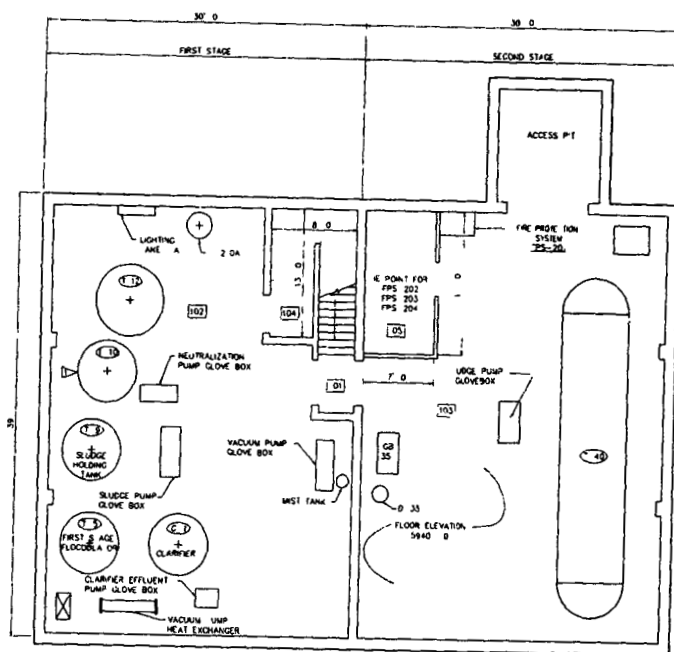


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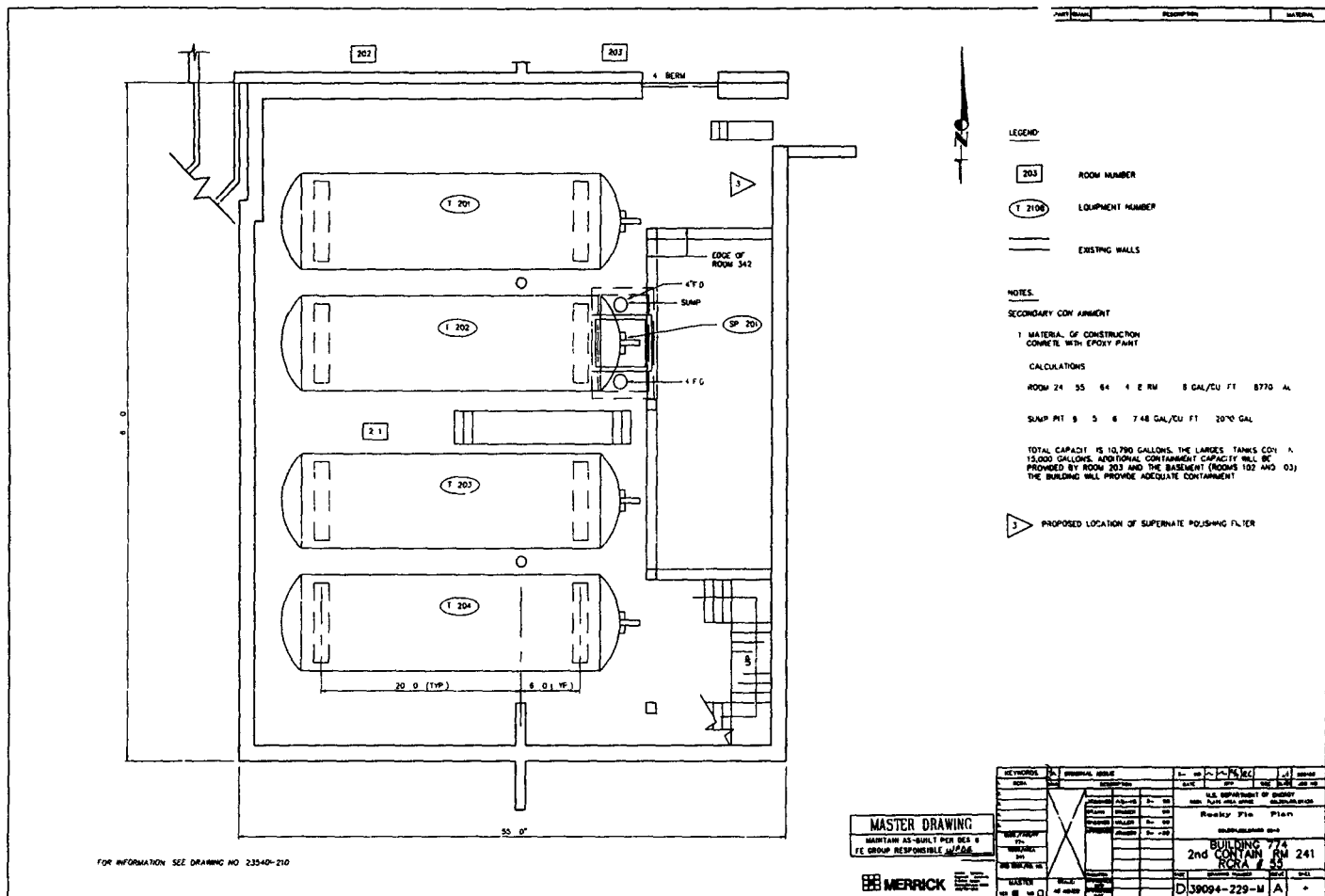
CALCULATIONS

RM 102
 (39' 10") (13' 8") 1086 ft²
 RM 103
 (39' 30") (14' 7") 107 ft²
 103 AL 2158 ft²
 LARGEST TANK 40 COM 15,730 GAL
 7300 GAL/7.48 GAL/FT³ 976 ft³
 976 ft³ 2136 ft² 44 F 3
 THERE ARE THE WALLS WILL BE COATED +
 EPOXY AN 1" DEPTH OF A LEAST
 5.5 TO PREVENT CONTAMINANT

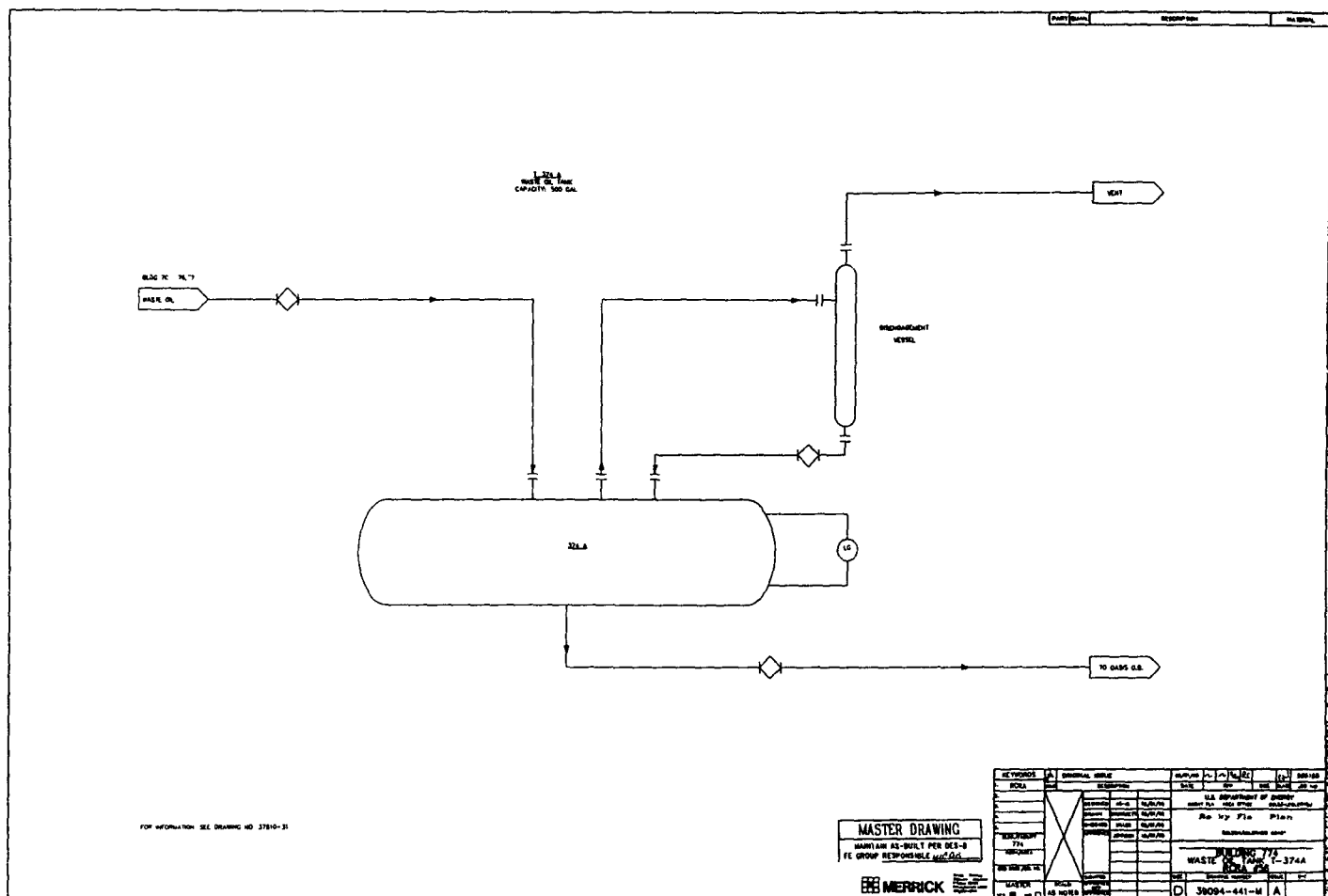
Hand-drawn schematic of a computer system. A central unit, labeled "COMPUTER" with a large "X" over it, is connected to a "MASTER" unit on the left, a "UNIT" on the right, and several "TERMINAL" units at the bottom. A "PRINTER" is also connected to the central unit. The diagram is enclosed in a rectangular border.

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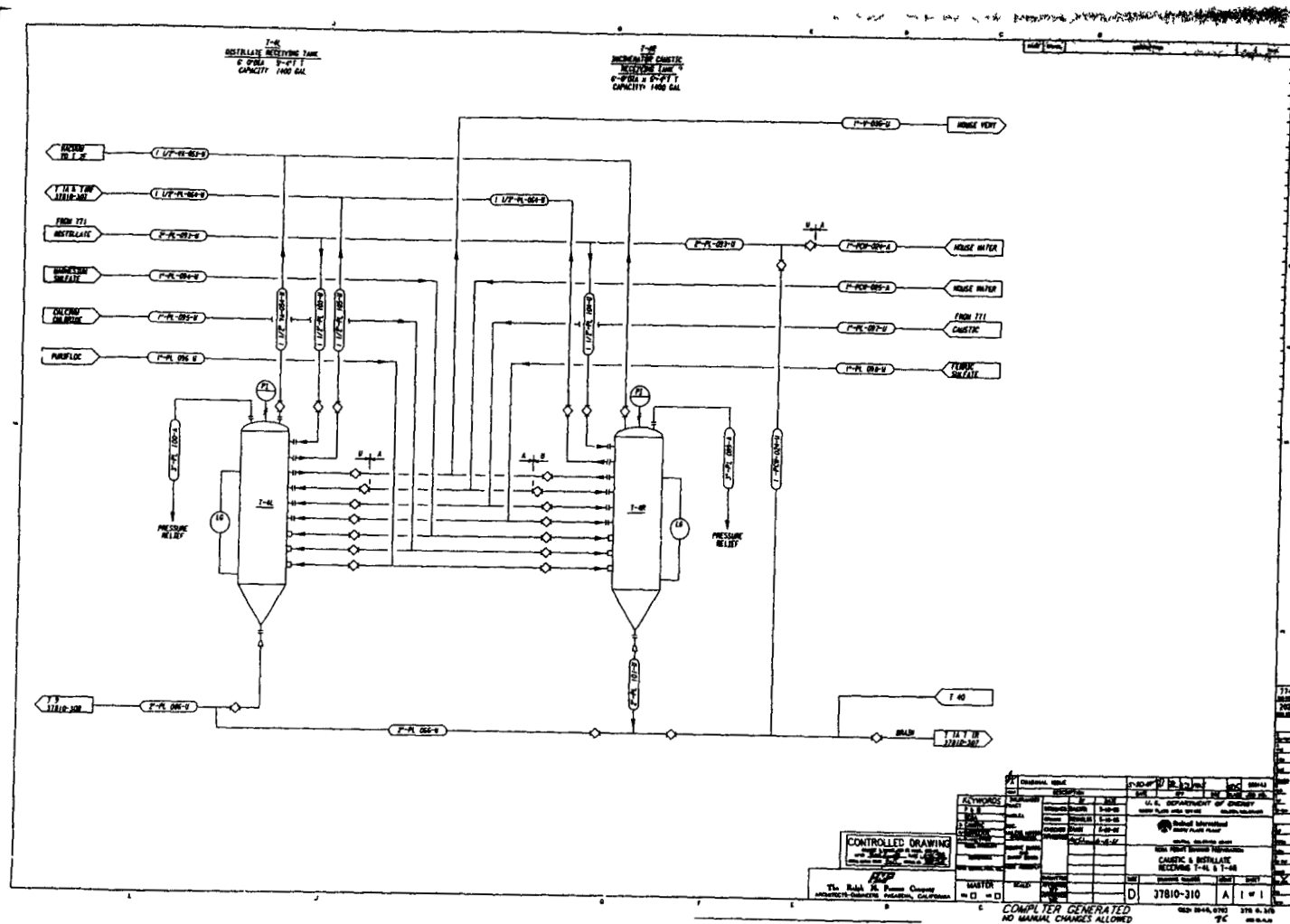
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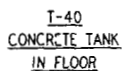
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COMPUTER-GENERATED NO MANUAL CHANGES





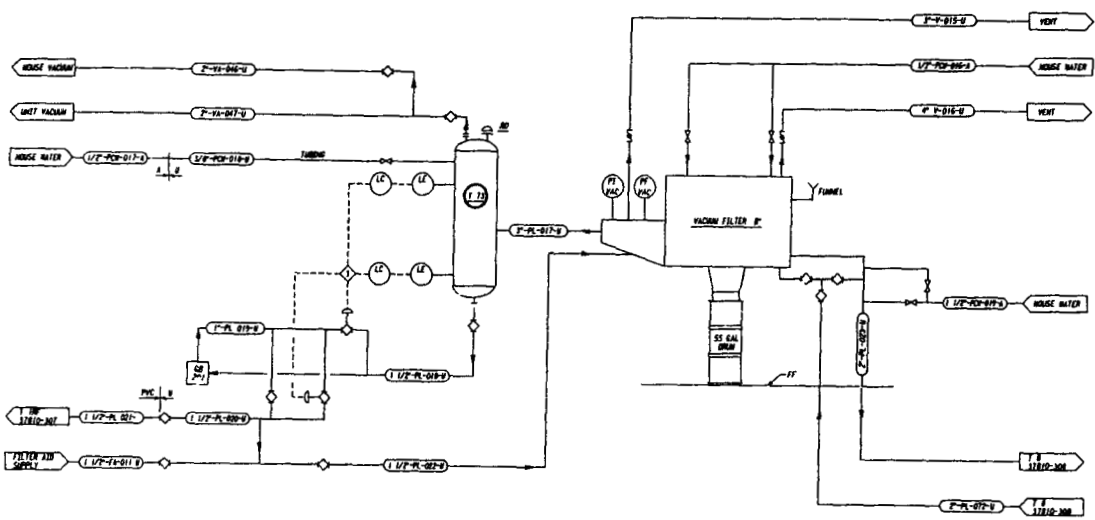
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MATERIAL OF CONSTRUCTION	CONCRETE
WHAT'S CONTAINED	HIGH NITRATE (BRIDGE FOR T. 203)
OVERALL DIMENSIONS	10'-2" LONG X 6'-0" WIDE X 15'-0" DEEP (EST)
CAPACITY (GAL.)	7200
SHELL THICKNESS	CONCRETE 1'-0" (EST)
WATERMAN (LIQUID LEVEL)	YES
SPECIFIC GRAVITY	1 (DECADED SOLUTION)
STRUCTURAL SUPPORTS	UNDERGROUND TANK
YEAR OF CONSTRUCTION	1953
SEAL TYPE	---
OPERATING PRESSURE	ATMOSPHERIC
OPERATING TEMPERATURE	100 F
DESIGN PRESSURE	
DESIGN TEMPERATURE	

		10-10-77 12 13 14 15-10-77 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 102	
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1-11
VACUUM FILTER
RECEIVING TANK
CAPACITY 20 GAL



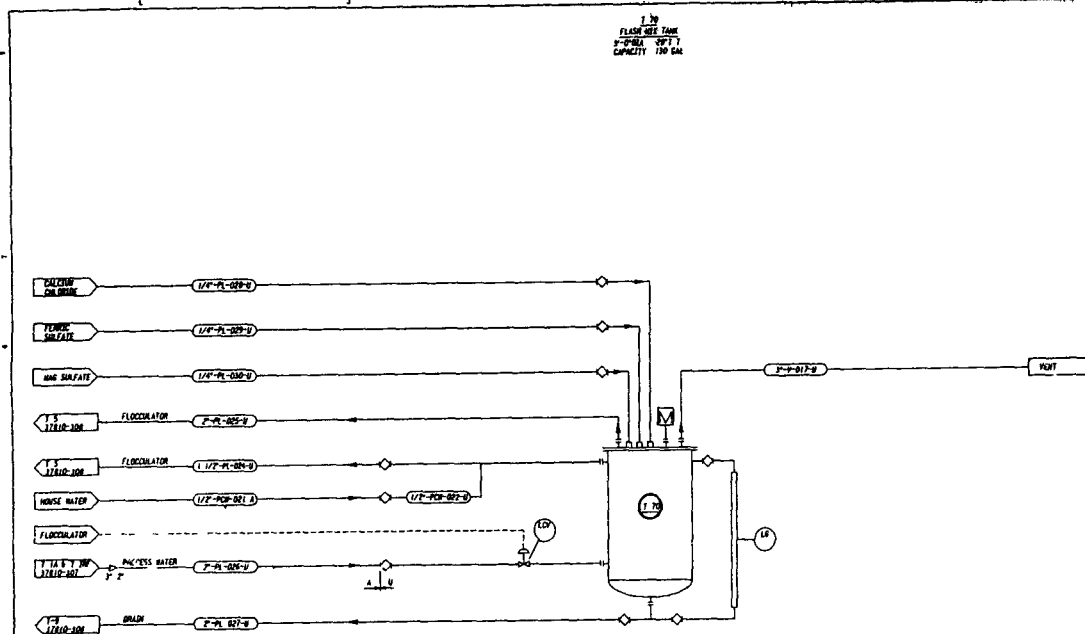
CONTROLLED DRAWING
- THIS DRAWING IS THE PROPERTY OF THE U.S. DEPARTMENT OF ENERGY AND IS TO BE KEPT UNDER CONTROL -

To: Edith E. Rupp, Counsel
PROPERTY-CONTROL

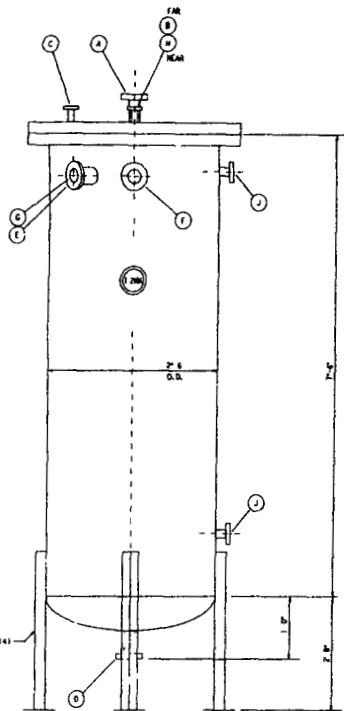
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COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED

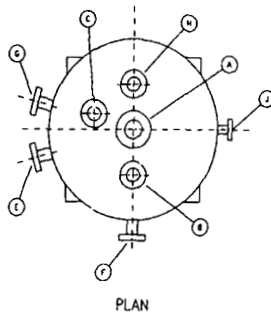
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COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED



ELEV



PLAN

NOZZLE SCHEDULE

SERVICE	MARK	NUMBER	SIZE	RATING	FACE	TYPE
WATER	A	1	1/2"	150#	FF	FLG
OVERFLOW	B	1	2"	150#	FF	FLG
VENT	C	1	2"	150#	FF	FLG
SLUDGE	D	1	2"	150#	FF	FLG
VAC. FILTER DRAIN	E	1	2"	150#	FF	FLG
WAST. PROC. WASTE	F	1	2"	150#	FF	FLG
PROCESS WASTE	G	1	4"	150#	FF	FLG
PROCESS LIQUID	H	1	2"	150#	FF	FLG
LEVEL GAUGE	J	2	3/4"	150#	FF	FLG

TANK INFORMATION TABLE

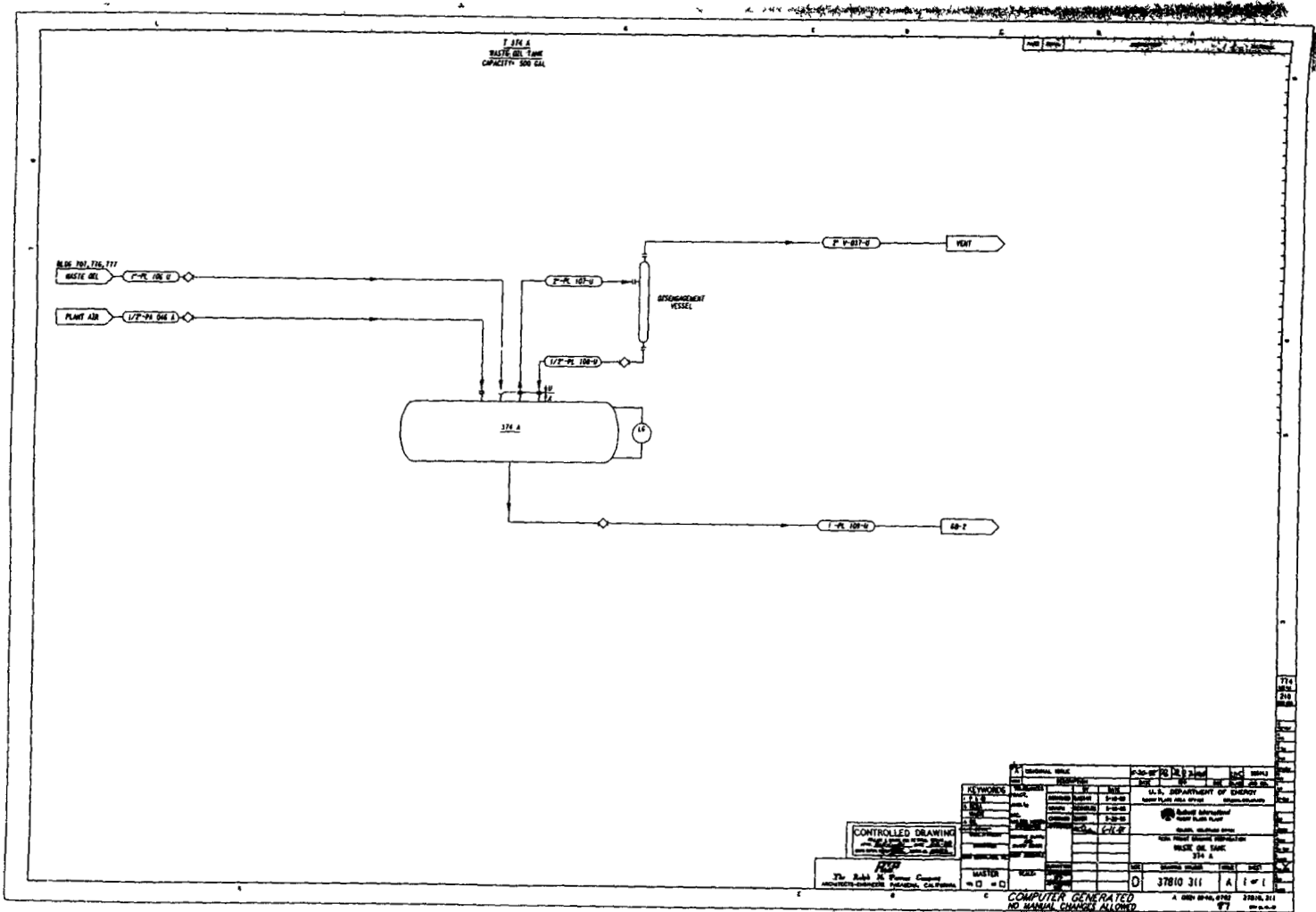
MATERIAL OF CONSTRUCTION	304L SS
WASTE CONTAINED	WHD. BASIC WASTE, NON EFFLUENT, HCI & INCOMPATIBLE WASTE
OVERALL DIMENSIONS	2'-0" DIA. 12'-0"
CAPACITY (GAL)	500
SHELL THICKNESS	250' LST
MAXIMUM LIQUID LEVEL	100'
SPECIFIC GRAVITY	1.0
STRUCTURAL SUPPORTS	141 3" ANGLE
YEAR OF CONSTRUCTION	1972
SEAM TYPE	WELD
OPERATING PRESSURE	10 PSIG WENT TO FILTER PLUM
OPERATING TEMPERATURE	130 F
DESIGN PRESSURE	
DESIGN TEMPERATURE	

CONTROLLED DRAWING

THE BAKER ENGINEERING COMPANY
ARCHITECTS-ENGINEERS, FARMERS, CALIFORNIA

REVISIONS	DATE	BY	CHKD.
1	10/1/72	J. BAKER	J. BAKER
2	10/1/72	J. BAKER	J. BAKER
3	10/1/72	J. BAKER	J. BAKER
4	10/1/72	J. BAKER	J. BAKER
5	10/1/72	J. BAKER	J. BAKER
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99	10/1/72	J. BAKER	J. BAKER
100	10/1/72	J. BAKER	J. BAKER

COMPUTER GENERATED
NO MANUAL CHANGES ALLOWED



APPENDIX C

771 CLOSURE PROJECT
IMPLEMENTATION SCHEDULE

